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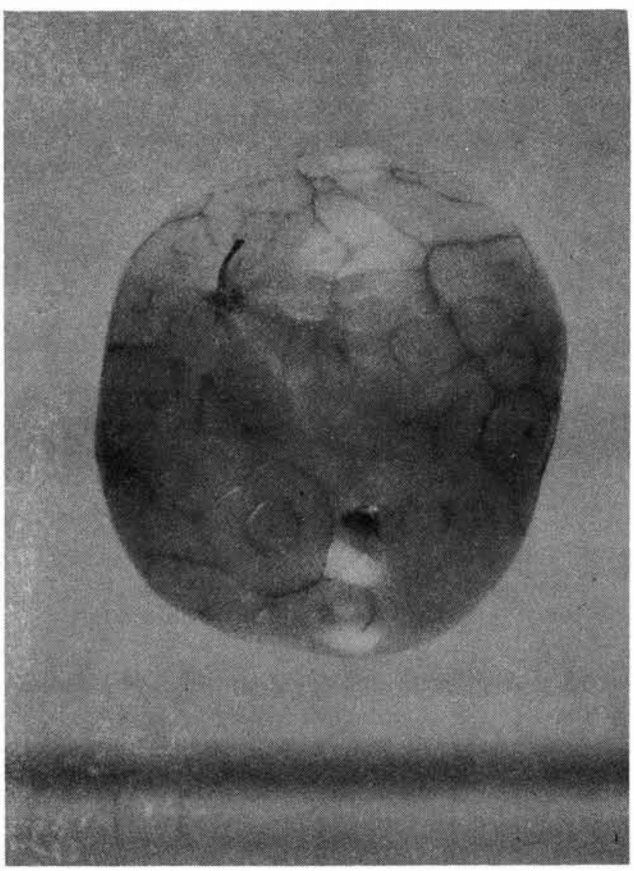

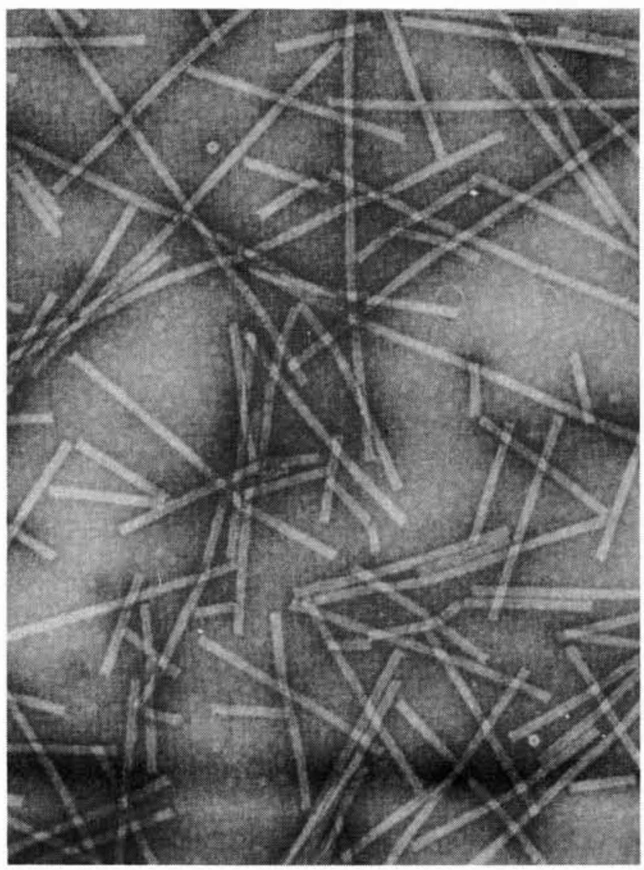

Corky ringspot disease of tomato caused by a strain of the common tobacco mosaic virus. Left: Symptoms of Corky ringspot disease on tomato fruit. Right: Transmission electron photomicrograph of the rod-shaped tobacco mosaic virus particles. Magnified 109,000x.

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AZALEA LEAF GALL

T. E. Tidwell

Leaf gall is a fungal disease of azaleas which causes the host plant to develop bladder-like galls (Fig. 1) on leaves and sometimes flowers. Leaf gall is seldom very damaging to individual plants, usually only a few leaves being affected per plant. However, in wet, shady growing sites this disease can become a real nuisance to persons responsible for large numbers of azaleas such as park maintenance crews or nurserymen. The nurseryman, of course, has the added problem of the adverse effect on the marketability of his disfigured "crop". The causal fungus, *Exobasidium vaccini* (Fckl.) Wor., is one of ten species of the genus *Exobasidium* which cause galls on leaves or flowers of many ornamentals in the Rhododendron family (Ericaceae). Some azalea cultivars are more susceptible than others, but none are known to be resistant to the disease.

Symptoms of leaf gall disease begin as leaf buds open in spring. Infected leaves develop thickened and fleshy bladder-like "galls". These soft, succulent galls may range in color from pale green to a reddish color, and gradually become brown and hard with age as they dry out. Azalea flowers may also be affected. Floral parts can become so greatly thickened that the entire flower becomes nothing more than a fleshy, irregular gall.

The galls are the result of hypertrophy (abnormal cell enlargement) of host cells. Thus, the leaf gall is composed primarily of abnormal leaf tissue. The causal fungus is one of the simple basidiomycetes that produces basidiospores superficially (on the surface of the host) rather than in a fleshy fruiting body such as a mushroom. The fungal mycelium is intercellular and the basidia (spore bearing cells) "erupt" through the gall surface. If the galls have a velvety white appearance, a close inspection will reveal the "bloom" of basidiospores borne on the basidia.

Moisture is necessary for infection of young susceptible tissue. Thus, cool, wet springs usually provide for a greater prevalence of azalea leaf gall. Likewise, damp, shady growing sites will result in more galls than dryer sites with good air circulation. The fungus remains in galled tissue and in infected debris around plants. Spores are carried by air currents and splashing water to emerging young growth to give rise to new infection sites.

To control azalea leaf gall, sanitation is a "must". Galled plant parts should be removed and destroyed as soon as they are detected, to prevent spore production. Removal of plant litter from around azaleas may also help in reducing the level of inoculum. It is rarely necessary for the homeowner to use fungicides to control the disease, however, large scale plantings of azaleas may justify their use, and certainly the nurseryman may want to use a fungicide spray to protect the marketability of his plants. In such cases, spraying with recommended fungicides, preferably with a good" spreader-sticker," helps prevent leaf gall infection, particularly when done as new growth appears, and during periods of wet weather.

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T. E. Tidwell is an Associate Plant Pathologist for Analysis and Identification Branch at CDFA.

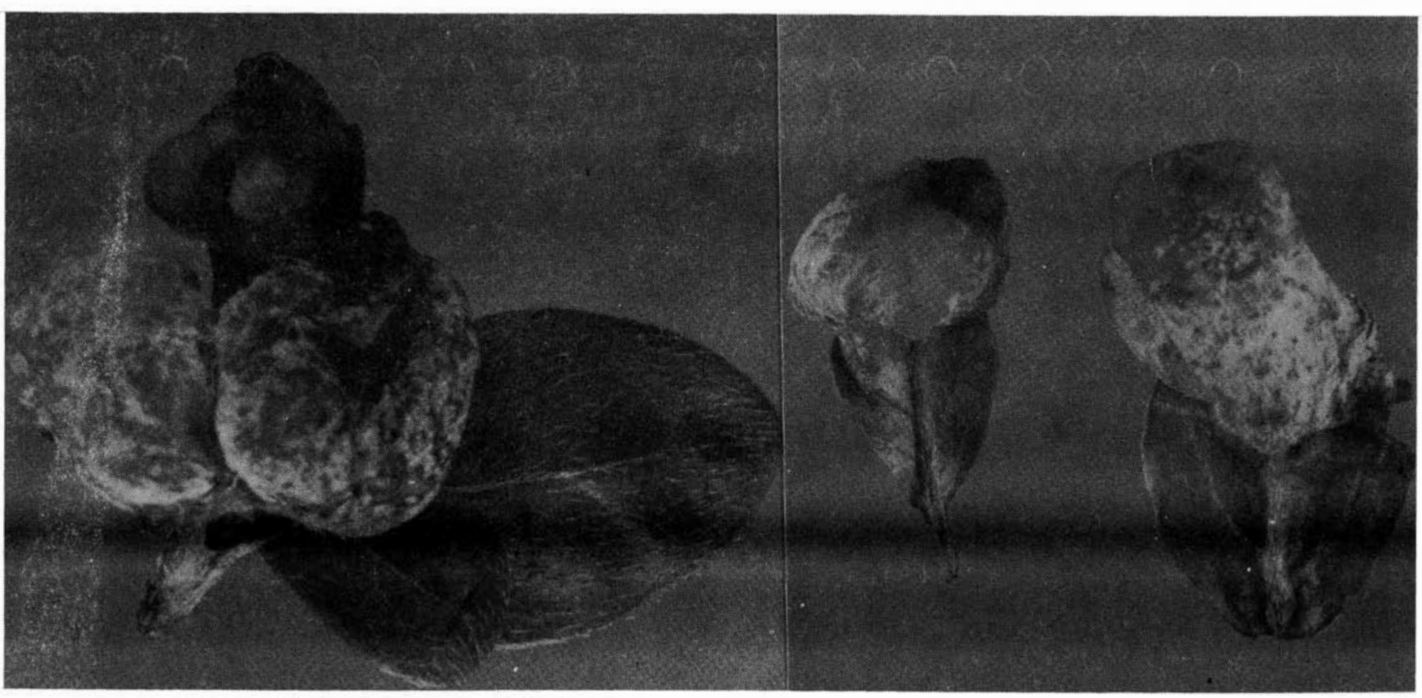

Fig. 1. Bladder-like galls on azalea leaves caused by the fungus *Exobasidium vaccini*.

RED THREAD - COOL WEATHER DISEASE OF TURF

Jeanenne B. White and Carl M. Lai

During this winter season the Plant Pathology laboratory has received several turfgrass specimens infected with *Corticium fuciforme* (*Laetisaria fuciformis*) the causal fungus of red thread disease. The disease was recently reported in Alameda, Santa Cruz and Sacramento counties. Red thread, first reported in the United States in 1932, has also been recorded as occurring in other California counties.

Red thread affects a wide range of cultivated turf hosts grown in golf courses, park recreation areas, commercial turf nurseries and home yards. The common turf hosts include bentgrass (*Agrostis* spp.), fescue (*Festuca* spp.), ryegrass (*Lolium* spp.), and bluegrass (*Poa* spp.). The most severely affected turfs appear to be the fescue cultivars.

The disease occurs primarily during cool, humid winter weather. Heavy dews, fog, misty rains and an optimum temperature of 68°C favor disease development. During warmer weather in the spring and autumn the disease may also occur, on slow-growing, nitrogen-deficient turf. Severe symptoms develop under conditions of low temperature, drought, inadequate soil fertility where soil is deficient in potassium, phosphorus, calcium and especially nitrogen, and during applications of turf growth regulators.

Initial infection occurs through stomatal openings on the leaf blade or sheath. Grass tissue becomes water-soaked and dies turning a straw color. Circular or irregular shaped patches of dead grass, 5-50 cm in diameter, are the first evident symptoms. Dead leaves are usually interspersed with healthy leaves causing the scorched looking patches to exhibit a diffuse or ragged appearance. Since only the foliage is infected, death of the turf plant usually occurs from the leaf tip downward. Under very humid conditions, pink to pale-red, thread-like mycelial structures called "red threads" are formed. The antlerlike mycelial threads extend up 10 mm beyond the leaf tips spreading in a web-like fashion, surrounding and connecting different leaf blades together.

Corticium fuciforme belongs to the Basidiomycete class of fungi and produces both basidiospores (perfect stage) and conidiospores (imperfect stage). The most commonly identifiable stage is the imperfect or asexual stage.

Corticium produces asexual spores called arthroconidia which develop in cottony pink masses at the tip of the mycelial red threads. The arthroconidia are hyaline, ellipsoid to cylindric and 5-7 x 10-47 um. Arthroconidia and the mycelial red threads are disseminated by wind, water, contaminated equipment, and animals or people. A film of moisture over the leaf or leaf sheath is necessary for germination of the fungus. *Corticium* is capable of killing turf leaves as early as two days after primary infection.

Control of red thread disease includes maintaining balanced soil fertility, especially nitrogen; maintaining optimal growing conditions including the proper soil pH (approx. 6.5 - 7.0), and the use of thorough and deep watering techniques early in the day; pruning of trees and shrubs to increase light and air circulation; disposing of infected turf clippings; planting less susceptible turf cultivars; and if necessary using the several recommended fungicides that offer excellent control of the disease.

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Red mycelial threads of Corticium fuciforme on ryegrass (Lolium sp.).

1986 CITRUS CANKER SURVEY

Dan C. Opgenorth

Since the discovery of citrus canker in Mexico in 1982 and in a Florida Nursery in August of 1984, this bacterial disease remains high on the list of detection priorities in California. Because of this concern, a meeting of field and laboratory pathologists involved in the survey project took place in Fresno on January 16. It was determined to continue California survey emphasis on nurseries in southern coastal areas where a greater potential exists for disease development due to climatic conditions. Plans were made to continue the present program for survey in Southern California. To facilitate the survey in the Central Valley, laboratory personnel with citrus responsibility have each agreed to provide up to several weeks of survey time. Objectives of the survey are to look at all nursery grown citrus in California at least twice a year and all commercial growers every four years or 25% annually.

While the California Department of Food and Agriculture (CDFA) survey will be exhaustive, it will not include non-commercial plantings. Of special interest in this regard is Citrus hystrix which is used for various types of Asian cooking. This variety is believed to be very susceptible to the citrus canker pathogen Xanthomonas campestris pv. citri. Symptoms of the disease can occur on all portions of the tree, leaves, fruit and twigs. A picture of a C. hystrix leaf was distributed to all insect survey trappers in the state with instructions to report the locations of the tree as they find it in placing and rotating traps.

Lesions on fruit and leaves are usually circular, may or may not be rough and can have a yellow margin if active. Twig cankers are usually not so diagnostic and may appear as sunken tan or light brown dead areas on twigs. Symptoms which distinguish citrus canker from other diseases are water soaked lesions with an oily margin. While some lesions may have a raised margin, leaves often show similar symptoms on both the upper and lower surfaces.

In the event that suspect material is found, it should be carefully removed from the tree and sealed in a plastic bag before being taken to the County Agricultural Commissioner's Office. Additional information including color plates and more complete descriptions of disease symptoms can be obtained at the County Commissioners' Office and are available to the public in English and Spanish.

We are especially pleased that laboratory personnel are going to participate in this year's survey. The laboratory is going to use a new identification technique based on a seriological method. The enzyme-linked immunosorbent assay (ELISA) test is used as a standard screening technique by Dr. Edwin Civerolo of the USDA at Beltsville, Maryland. We will be comparing ELISA and our currently used bacterial microscopic streaming technique.

In some cases. we feel the ELISA method may be 100 times more sensitive than the microscopic method. ELISA is also strain specific allowing laboratory identification of strains A-B-C & D within 48 hr. While ELISA may be more sensitive, this could lead to some false positives.

Thus all determinations made by ELISA will need to be confirmed by classical culture methods. Even with these disadvantages, ELISA should prove to be a valuable laboratory method because of its sensitivity, ability to identify strains, rapidity and high volume capabilities. Because of its use by USDA, we believe our implementation of ELISA methods on citrus canker will greatly assist the survey and detection programs in California.

Dan C. Opgenorth is an Associate Plant Pathologist for Analysis and Identification Branch at CDFA.

SUMMARY OF DIAGNOSES FOR SHADE TREES AND CONIFERS FOR THE CALENDAR YEAR 1985

Barbara Pauly and T.E. Tidwell

The following is an abbreviated list of diagnoses for samples of shade trees and conifers which were received by the CDFA laboratory during 1985. The sources for these samples include parks, both urban and forest; urban street trees; dooryards; various landscaped facilities such as office and residential complexes, schools, etc.; both wholesale and retail nurseries; governmental and private conifer seedling nurseries; Christmas tree farms; forests, on both private and government land; and highway plantings, and border inspection stations. Clients submitting such samples range from various state, city, and county officials, to private homeowners, commercial growers and nurserymen. No attempt was made to confirm pathogenicity of organisms reported on the samples. The list merely tabulates the various organisms isolated from the samples or reflects the type of damage observed on the sample. Nor was this list intended to be exhaustive, but rather, merely a summary of samples received. The numbers following a host and diagnosis represents the specific California county or border inspection station from which the sample originated. The numbers and their respective counties and inspection stations are as follows:

BORDER STATIONS

STATE

59 Alturas
60 Benton
61 Blythe
62 Long Valley
63 Dorris
64 Meyers
65 Hornbrook
66 Needles
67 Redwood Highway
68 Smith River
69 Topaz
70 Truckee
71 Tulelake
72 Vidal
73 Winterhaven
74 Yermo

FEDERAL

90 Andrade
91 Mexicali
92 Tecate
93 San Ysidro

PORTS

STATE

80 Crescent City
81 Eureka
82 Hueneme & Ventura
83 Monterey
84 Sacramento
85 San Luis Obispo
86 Santa Barbara
87 Stockton

FEDERAL

95 Port of San Diego
96 Port of San Francisco
97 Port of San Pedro

1.	Alameda	30.	Orange
2.	Alpine	31.	Placer
3.	Amador	32.	Plumas
4.	Butte	33.	Riverside
5.	Calaveras	34.	Sacramento
6.	Colusa	35.	San Benito
7.	Contra Costa	36.	San Bernardino
8.	Del Norte	37.	San Diego
9.	El Dorado	38.	San Francisco
10.	Fresno	39.	San Joaquin
11.	Glenn	40.	San Luis Obispo
12.	Humboldt	41.	San Mateo
13.	Imperial	42.	Santa Barbara
14.	Inyo	43.	Santa Clara
15.	Kern	44.	Santa Cruz
16.	Kings	45.	Shasta
17.	Lake	46.	Sierra
18.	Lassen	47.	Siskiyou
19.	Los Angeles	48.	Solano
20.	Madera	49.	Sonoma
21.	Marin	50.	Stanislaus
22.	Mariposa	51.	Sutter
23.	Mendocino	52.	Tehama
24.	Merced	53.	Trinity
25.	Modoc	54.	Tulare
26.	Mono	55.	Tuolumne
27.	Monterey	56.	Ventura
28.	Napa	57.	Yolo
29.	Nevada	58.	Yuba

Host	Diagnosis	County of Origin
Abies sp.	*Phoma* sp.	23
	Stemphylium sp.	23
	Herpotrichia nigra	52
Abies concolor	*Phoma* sp.	04
	Fusarium oxysporum	04,44
	Rhizoctonia solani	04
	Pythium spinosum	44
	Pythium sp.	44,04,41
	Botrytis sp.	44
	Virgella robusta	09
	Lirula abietis - concoloris	09
Abies magnifica	Phenoxy herbicide injury	23
	Phoma sp.	23
Acacia melanoxylon	Wooly apple aphid injury	34
Acacia sp.	*Fusarium solani*	37
	Phoma sp.	48
	Nectria coccinea	37

<u>Acer macrophyllum</u>	<u>Armillaria mellea</u>	34
<u>Acer palmatum</u>	Chemical injury	54
	<u>Pythium</u> sp.	23
	<u>Armillaria mellea</u>	07
	Iron deficiency in heavy soil	34
	<u>Verticillium</u> sp.	34
<u>Acer saccharinum</u>	<u>Pythium</u> sp.	47
	Saprophtic Basidiomycete	34
<u>Acer</u> sp.	<u>Oidium</u> sp.	19
<u>Alnus cordata</u>	Sunscald injury	34
<u>Alnus</u> sp.	<u>Poria</u> sp.	68
	<u>Cytospora</u> sp.	48
	<u>Diplodia</u> sp.	34
<u>Alnus incana</u>	<u>Taphrina robinsoniana</u>	44
<u>Arbutus menziesii</u>	<u>Fusicoccum</u> sp.	21,17
	<u>Heterobasidion annosum</u>	29,17
	<u>Asperosporium</u> sp.	17
<u>Calocedrus decurrens</u>	Normal autumn branchlet dropping	21
<u>Carya illenoensis</u>	Insect injury	61
<u>Castanea dentata</u>	<u>Pseudomonas</u> sp.	31
<u>Cedrus</u> sp.	Chemical injury	43
<u>Cedrus deodara</u>	Insect injury	34
	Chemical injury	43
<u>Cinnamomum camphora</u>	<u>Verticillium</u> sp.	07
	<u>Botryosphaeria ribis</u>	23
	Insect injury	01
<u>Cornus nuttallii</u>	<u>Macrophoma</u> sp.	04
<u>Cupressus arizonica</u>	Insect injury	06
<u>Cupressus macrocarpa</u>	<u>Seiridium cardinale</u>	48
<u>Cupressus sempervirens</u>	Chemical injury	34
<u>Cupressus</u> sp.	Sooty mold fungus and incense cedar scale	04
	<u>Xylococculus macrocarpa</u>	04
	<u>Seiridium cardinale</u>	01

Eucalyptus sp.	Frost injury	09
	Herbicide injury	09
	Heterosporium eucalypti leaf spot fungus	09,39
	Gloeosporium sp.	39
	Oedema	01,12
	Rhizoctonia solani	57
	Trichoderma sp.	57,29
	Pythium sp.	34
	Botrytis cinerea	57
	Phytophthora sp.	34
	Dothiorella sp.	31
	Normal callus tissue	44
	Botryosphaeria ribis	31
	Lignotubers	44
	Mechanical wounding injury	41
	Chemical injury	41
	Oedema	12
	Phomopsis sp.	29
	Phoma sp.	29
	Alternaria sp.	29
	Fusarium solani	29
	Penicillium sp.	29
	Saprophytic Basidiomycete	38
Fraxinus velutina	*Gloeosporium aridum*	34
Fraxinus sp.	*Gloeosporium aridum*	35,47
Ginkgo biloba	Chemical injury	11
Eriobotrya japonica	*Fusicladium erioleotryoe*	43
	Entomosporium maculatum	43
	Fusicladium riobotryae	43
	Natural senescence	23
Euonymus japonica	Microsphaera alni	05
Euonymus sp.	*Pythium* sp.	24
	Phyllosticta sp.	40
	Oidium sp.	40
	Microsphaera alni	40
Heteromeles arbutifolia	*Gloeosporium* sp.	09
	Fusicladium photinicola	40
Juglans sp.	Chemical injury	57,43
	Xanthomonas juglandis	56
	Nutritional deficiency	57
Juglans nigra	*Phytophthora* sp.	52,51
	Genetic chimera	52

Liquidambar sp.	Genetic sport	34
	Chemical injury	34
	Armillaria mellea	48
	Botryosphaeria dothidea	51
	(*Dothiorella* sp.)	
Liriodendron tulipifera	Chemical injury	34
	Insect injury	07
Magnolia grandiflora	Insect injury	44
Magnolia sp.	Genetic color breaking	19
	Insect injury	31
Mahonia spp.	*Cumminsiella mirabilissima*	59
Maytenus boaria	*Phytophthora* sp.	27
Morus sp.	*Botrytis cinerea*	54
Olea europea	*Cycloclonium oleaginum*	07
Picea abies	sunscald injury	23
Picea sp.	*Phytophthora* sp.	06
Pinus sp.	Insect injury	34,24
	Pine needle scale,	
	Chionaspis pinifoliae	25
	Endocronartium harknessii	17
	Dothistroma pini	12
Pinus contorta	*Lophodermium* sp.	12
Pinus coulteri	*Fusarium oxysporum*	44
	Phytophthora sp.	44
	Pythium sp.	44
Pinus lambertina	*Fusarium oxysporum*	04
Pinus mugo	*Pythium* sp.	47
Pinus muricata	Aphids and sooty mold	23
Pinus pinea	Herbicide injury	34
Pinus ponderosa	Insect injury	17
	Sooty mold	45
Pinus radiata	Insect injury	38,23,12
	Dothistroma pini	41
	Mite injury	48
	Chemical injury	48
	Pythium sp.	54

Platanus occidentalis	*Gloeosporium nervisequum*	43,47
	Scale injury	34
	Chemical injury	45
Platanus acerifolia	*Cytospora plantarii*	10
Populus nigra	Scale and mite injury	39
	Cytospora chrysosperma	39
	Fusarium solani	39
	Carpenter worm injury	39
Populus sp.	Normal callus tissue	34
	Nutritional deficiency	24,09,25
Pseudotsuga menziesii	*Nectria cinnabarina*	23
	Fusarium oxysporum	04,49
	Phoma sp.	04,23
	Phytophthora sp.	06
	Pythium sp.	49,04,09
	Phomopsis sp.	04
	Rabdocline pseudotsugae	12
	Phaeocryptopus gaeumannii	12,49,27
	Insect injury	49,43,41
	Verticicladiella wageneri	23
	Armillaria mellea	45
	Fomitopsis cajanderi	49
	Fomes sp.	49
	Pholiota sp.	49
	Douglas-fir needle midge injury	12
Quercus agrifolia	Cynipid gall wasp injury	34
	Cryptocline cinerescens	40,43
Quercus coccinea	Insect injury	11
Quercus douglasii	Physiological	31,49
	Phytophthora sp.	31
	Pythium sp.	31
Quercus dumosa	*Antron echinus*, sea urchin gall of the cynipid gall wasp	52
Quercus lobata	Multiple saprophytes,	28
	Botryodiplodia sp.	28
	Oak pit scale, *Asterolecanium minus*	28
	Insect injury	07
	Phytophthora sp.	39
Quercus nigra	Insect injury	04

Quercus palustris	*Actinopelte dryina*	04
	Nectria cinnabarina	06
Quercus robur	*Phomopsis* sp.	06
Quercus suber	Normal leaf drop for cork oaks	11
	Mechanical wounding	41
	Chemical injury	04
Quercus virginiana	*Dryocosmus dubiosus*	27
	Insect injury	34,04
	Sooty mold	43
	Gloeosporium quercinum	27
	Cynipid gall wasp injury	43
Quercus sp.	Adventitious bud proliferation	01
	Armillaria mellea	64
	Bispora sp.	43
	Gall wasp injury	43,09
	Oidium sp.	40,34
	Insect injury	23
	Diplodia quercina	23
	Saprophytic basidiomycete	73
	Microsphaeria alni	17
Salix sp.	*Cytospora* sp.	28
	Normal callus tissue	48
Schinus molle	*Pseudomonas syringae*	23
	Verticillium sp.	27
	Pestolotia sp.	27
Sequoiadendron giganteum	*Botrytis cinerea*	12
	Botryosphaeria ribis	23,31,04,10
	Phoma sp.	31
	Cytospora sp.	31
	Dothiorella gregaria	23
Sequoia sempervirens	Chemical injury	28,21
	Phytophthora sp.	34
	Coryneum sp.	49
	Botryosphaeria ribis	11
	Pythium sp.	44
	Tetranychid mite, *Oligonychus ununguis*	43
	Amillaria mellea	12
	Trichothecium sp.	10
	Sooty mold	10
	Glomus sp.	44
	Botrytis sp.	44

Thuja sp.	Insect injury	01
Tilia cordata	*Armillaria mellea*	01
Ulmus parvifolia	*Pythium* sp.	51
Ulnus sp.	Natural senescence	47
	Sooty mold	63
Umbellularia Californica	*Dothiorella* sp.	23
	Phytophthora sp.	21
	Pythium sp.	21
Zelkova sp.	*Phomopsis* sp.	28
	Arthrobotrys sp.	28

SUMMARY OF DIAGNOSES OF PLANT VIRUS DISEASES FOR THE CALENDAR YEAR 1985

Wendy Matsuo

The following is a list of the positive identifications of plant viruses on a wide variety of plant hosts. The plant samples were sent in by counties, nurseries, and private citizens. The numbers following the host and diagnosis represent the specific California county and/or border inspection station from which the sample originated. The numbers and their respective counties and border inspection stations as follows:

COUNTIES

1. Alameda
2. Alpine
3. Amador
4. Butte
5. Calaveras
6. Colusa
7. Contra Costa
8. Del Norte
9. El Dorado
10. Fresno
11. Glenn
12. Humboldt
13. Imperial
14. Inyo
15. Kern
16. Kings
17. Lake
18. Lassen
19. Los Angeles
20. Madera
21. Marin
22. Mariposa
23. Mendocino
24. Merced
25. Modoc
26. Mono
27. Monterey
28. Napa
29. Nevada
30. Orange
31. Placer
32. Plumas
33. Riverside
34. Sacramento
35. San Benito
36. San Bernardino
37. San Diego
38. San Francisco
39. San Joaquin
40. San Luis Obispo
41. San Mateo
42. Santa Barbara
43. Santa Clara
44. Santa Cruz
45. Shasta
46. Sierra
47. Siskiyou
48. Solano
49. Sonoma
50. Stanislaus
51. Sutter
52. Tehama
53. Trinity
54. Tulare
55. Tuolumne
56. Ventura
57. Yolo
58. Yuba

BORDER STATIONS

STATE

59 Alturas
60 Benton
61 Blythe
62 Long Valley
63 Dorris
64 Meyers
65 Hornbrook
66 Needles
67 Redwood Highway
68 Smith River
69 Topaz
70 Truckee
71 Tulelake
72 Vidal
73 Winterhaven
74 Yermo

FEDERAL

90 Andrade
91 Mexicali
92 Tecate
93 San Ysidro

PORTS

STATE

80 Crescent City
81 Eureka
82 Hueneme & Ventura
83 Monterey
84 Sacramento
85 San Luis Obispo
86 Santa Barbara
87 Stockton

FEDERAL

95 Port of San Diego
96 Port of San Francisco
97 Port of San Pedro

Host	Diagnosis	County of Origin
Abutilon sp.	Abutilon mosaic	38
Alstroemeria sp.	Hippeastrum mosaic	44,43
Apium graveolens var. _dulce_	Celery mosaic	35,56,42
Beta vulgaris	Beet mosaic	35,57
	Beet yellows	06,57
	Beet western yellows	57
Brassica oleracea var. _botrytis_	Cauliflower mosaic	42
Camellia japonica	Camellia yellow mottle	44,37
Capsicum annuum	Alfalfa mosaic	10,39
	Tomato spotted wilt	10,37,43
Capsicum frutescens	Tobacco mosaic	10
	Tomato spotted wilt	10,19,57
	Apple mosaic	57,24
	Alfalfa mosaic	24,56
Capsicum sp.	Alfalfa mosaic	24
Chrysanthemum sp.	Tomato spotted wilt	56,27,42
Cineraria sp.	Tomato spotted wilt	27
Citrullus lanatus	Watermelon mosaic	34
Conium maculatum	Western celery mosaic	40
Cucumis melo	Squash mosaic	34,11
	Watermelon mosaic	06,13
Cucumis melo var. _cantalupensis_	Watermelon mosaic	34,06,24,48
	Squash mosaic	06,24
Cucumis sativus	Squash mosaic	56
	Watermelon mosaic	49,06
Cucurbita pepo	Watermelon mosaic	37,07,23
Cucurbita sp.	Watermelon mosaic	42,37,51,33,23
	Beet curly top	56,11,06,58
	Squash mosaic	06,13,56,42
Daucus carota var. _sativus_	Carrot red leaf	35
Euphorbia pulcherrima	Poinsettia mosaic	39
Ficus carica	Fig mosaic	34,24
Freesia sp.	Bean yellow mosaic	43,27
Lactuca sativa	Lettuce mosaic	56,34
	Cucumber mosaic	56
	Lettuce big vein	43,56
Liliaceae	Lily fleck disease	12
Limonium sp.	Turnip mosaic	42
Lycopersicon esculentum	Tomato spotted wilt	23,37
	Curly top	37,06
	Alfalfa mosaic	06
	Potato virus Y	37
	Tobacco mosaic	37
	Potato virus X	57
	Potato virus S	57
Malus sylvestris	Apple green crinkle	12
	Apple star crack	10
Masdevallia sp.	Bean yellow mosaic	40,31

Medicago sativa	Alfalfa mosaic	10
	Apple mosaic	16
Nandina campacta	Nandina mosaic	43
	Cucumber mosaic	
Narcissus pseudonarcissus	Narcissus yellow stripe	12
Nasturtium officinale	Cucumber mosaic	43
Orchidaceae	Tobacco mosaic	19
	Cymbidium mosaic	19
Pelargonium x *hortorum*	Tomato ringspot	34
Pelargonium sp.	Tomato ringspot	34
	Tobacco ringspot	34
Petroselinum crispum	Celery mosaic	56
Phaseolus vulgaris	Bean common mosaic	09,42,40
Prunus amygdalus	Prunus necrotic ringspot	06,57,39
	Prune dwarf	04
	Almond bud failure	57
Prunus dulcis	Almond leaf scorch	57
Prunus persica	Yellow bud mosaic	34,57
	Prunus necrotic ringspot	24
	Tomato ringspot	57
	Peach yellow leaf roll	24
Prunus sp.	Prunus necrotic ringspot	24
Pryus communis	Star crack	01
Rosa sp.	Prunus necrotic ringspot	34,43,24
	Prune dwarf	34,43
	Apple mosaic	34,24
	Tomato ringspot	34
Solanum tuberosum	Potato virus x	34,25,47,45
	Potato virus s	34,25,47,15,18 33,45,39
	Potato virus y	34,18
	Potato virus leafroll	34,25,47
Triticum aestivum	Barley yellow dwarf	54,13
Viola tricolor	Alfalfa mosaic	43
Vinca minor	Cucumber mosaic	56
Vinca sp.	Cucumber mosaic	43
Vitis vinifera	Grapevine leafroll	34
	Corky bark	34
	Leafroll-graft	49
	Pierce's disease	34
Zea mays	Sugar cane mosaic	48

STATE OF CALIFORNIA
DEPARTMENT OF FOOD AND AGRICULTURE
DIVISION OF PLANT INDUSTRY

PEST RATING LIST
PLANT PATHOGENS: VIRUS AND VIRUS-LIKE DISEASES

In this booklet, there is no separate listing for plant viruses using the Latin binominal (genus and species) system. This is because there isn't as yet, an organized and acceptable virus classification using this method.

Therefore, naming of plant viruses is usually based on the most conspicuous symptom they cause on the first host from which they were described.

Virology, as a science, is relatively young. The first virus was discovered in 1898 and since that time more than 400 plant viruses have been described and named. Early research workers have tried to develop systems of nomenclature and classification, but they were inadequate and created much confusion. A system of virus classification will necessarily have to await the development of more information regarding the relationship and characteristics of plant viruses.

PEST RATING LIST, PLANT PATHOGENS: VIRUS AND VIRUS-LIKE DISEASES

"A"-Eradication, quarantine, or other holding action at the state-county level. Quarantine interceptions to be rejected or treated at any point in the state.

Citrus tristeza virus	Quick decline
*Elm phloem necrosis disease	MLO**
*Peach little peach disease	Strain of Peach yellows disease (MLO)
*Peach mosaic virus	
*Peach phony peach disease	(bacterium-like micro-organism)
Peach red suture virus	
*Peach rosette disease	(MLO)
Peach rosette mosaic virus	
*Peach wart virus	
*Peach yellows disease	(MLO)
*Walnut bunch disease	(MLO), Bunch disease; witches' broom

"B"-Intensive control or eradication, where feasible, at the County level. Quarantine or other holding action at the discretion of the commissioner.

Apricot ring pox virus	Cherry twisted leaf. Apricot ring pox
Cherry bark blister virus	See: Cherry necrotic rusty mottle disease
Cherry buckskin disease	See: Peach western x-disease
Cherry little cherry disease	Symptomless in flowering cherry: Kootenay little cherry. K & S little cherry
Cherry mottle leaf virus	
Cherry necrotic rusty mottle virus	
Cherry rasp leaf virus (American)	Rasp leaf of cherry/peach
Cherry rusty mottle virus	Mild rusty mottle. Severe rusty mottle
Cotton leaf crumple virus	
Grape enation virus	See: Grape fanleaf virus
Grape fanleaf virus	Fanleaf, Enation, vein-banding, yellow mosaic
Grape veinbanding virus	See: Grape fanleaf virus
Grape yellow mosaic virus	See: Grape fanleaf virus
Ollalie dwarf virus	Yellow dwarf of onion/ Allium
Onion yellow dwarf virus	(MLO) Western X
Peach yellow bud mosaic virus	Strain of Tomato ringspot virus
Peach yellow leaf roll disease	Strain of Peach western x-disease
Prunus stem pitting virus	Strain of Tomato ringspot virus
Rose leaf curl disease	

"B" Pests Continued.....

Rose rosette disease	Rose witches' broom
Rose spring dwarf disease	
Tomato ringspot virus in peach	Peach yellow bud mosaic; Prunus stem pitting

"C"-Control, eradication, as local conditions warrant, at the county level. Quarantine or other holding action at the discretion of the commissioner.

Alfalfa dwarf	See: Grape Pierce's disease
Alfalfa mosaic virus	Calico of potato/pepper
Almond calico virus	Drake almond bud failure (not to be confused with genetic bud failure) a strain of Prunus ringspot virus
Apple chlorotic leaf spot virus	Symptomless in most commercial apples. Pear Raspberry bushy dwarf.
Apple flat limb virus	Symptomless in some varieties, damaging in "Gravenstein"
Apple green crinkle virus	
Apple mosaic virus	Strain of Prunus ringspot virus
Apple starcracking virus	See: Apple green crinkle virus
Apple stem pitting virus	
Artichoke curly dwarf virus	
Aster yellows disease	(MLO)
Barley stripe mosaic virus	Barley false stripe
Barley yellow dwarf virus	
Bean common mosaic virus	Common bean mosaic virus. Bean virus 1
Bean yellow mosaic virus	Yellow bean mosaic virus. Bean virus 2
Beet curly top virus	Curly top of beet/tomato/ pepper/bean; Green dwarf of potato
Beet mosaic virus	
Beet western yellows virus	
Beet yellow net virus	
Beet yellow stunt virus	
Beet yellows virus	Beet yellows
Blackberry dwarf virus	
Blackberry mosaic virus	in part: Tomato ringspot virus in part: Prunus ringspot virus
Cabbage black ringspot	See: Turnip mosaic virus
Carnation etched ring virus	
Carnation mottle virus	
Carnation necotic fleck	
Carrot motley dwarf virus	Motley dwarf virus
Cattleya infectious blossom necrosis virus	Strain of Cymbidium mosaic virus

"C" Pests Continued.....

Cauliflower mosaic virus	
Celery yellows disease	See: Aster yellows disease
Cherry rugose mosaic virus	Strain of Prunus ringspot virus
Cherry sour cherry yellows virus	Prune dwarf virus
Chrysanthemum stunt virus	
Clover yellow mosaic virus	
Cow pea mosaic virus	various viruses
Cucumber mosaic virus	Cucumber mosaic. Beet dwarf. Canna mosaic. Daphne mosaic. Delphinium stunt. Lima bean mosaic. Passion fruit woodiness. Raspberry yellow blotch. Spinach blight. Tomato shoestring (=Tomato fern-leaf)
Currant mosaic virus	See: Tomato ringspot virus
Dasheen mosaic	
Filaree red leaf virus	
Grape Pierce's disease	(bacterium-like microorganism)
Hippeastrum mosaic virus	
Hop mosaic virus	
Kalanchoe mosaic virus	
Lettuce big vein virus	
Lettuce mosaic virus	
Lettuce speckles disease	
Lily necrotic fleck (Easter lily fleck)	Combination: Lily symptomless virus and Cucumber mosaic virus
Loganberry calico virus	
Maize dwarf mosaic	See: Sugarcane mosaic virus
Malva vein clearing virus	
Malva yellows virus	See: Beet western yellows virus
Muskmelon vein necrosis virus	
Narcissus mosaic virus	various viruses
Pea enation mosaic virus	
Pea mosaic virus	
Peach blotch virus	
Peach calico virus	

"C" Pests Continued.....

Peach stubby twig virus	
Peach stunt virus complex	Combination: Prune dwarf virus and a strain of Prunus ringspot virus
Pear bark measles virus	Stony pit virus of the fruit may or may not be present
Pear decline disease	(MLO). Pear decline. Red leaf curl
Pear mosaic virus	See: Apple chlorotic leaf spot virus
Pear stony pit virus	
Pear vein yellows virus	Pear vein yellows. Pear red mottle
Pittosporum ringspot	
Plum line pattern virus	Rare. Indexes negative on Shirofugen
Potato leaf roll virus	
Potato spindle tuber virus	
Potato stem mottle virus	See: Tobacco rattle virus
Prune diamond canker virus	
Prune dwarf virus	Sour cherry yellows; also see: Peach stunt virus complex
Prunus ringspot virus	Prunus necrotic ringspot; Prunus recurrent ringspot; Plum line pattern; Virus almond bud failure; apple mosaic; Rose mosaic; Cherry tatter leaf.
Quince sooty ringspot virus	
Quince stunt virus complex	Probable combination: Quince sooty ringspot virus and Apple chlorotic leaf spot virus
Radish mosaic virus	
Raspberry yellow mosaic virus	
Raspberry yellow net virus	
Red currant mosaic virus	See: Tomato ringspot mosaic
Rose mosaic virus	See: Prunus ringspot virus
Rose streak virus	
Sorghum concentric ring blotch virus	See: Sugarcane mosaic virus
Sow thistle yellow vein virus	
Spinach yellow dwarf virus	Rare. Possibly Cucumber mosaic virus
Squash leaf curl virus	

"C" Pests Continued.....

Squash mosaic virus	
Strawberry yellows virus	Combination: two or more viruses from two groupings, minimum of one from each group (not to be confused with Blakemore yellows)
Sugarbeet curly top virus	See: Beet curly top virus
Sugarcane mosaic virus	Sugarcane mosaic on sugarcane
Sugarcane mosaic virus Johnsongrass strain	Sugarcane mosaic on corn/Johnson grass. Maize dwarf mosaic
Sunflower mosaic virus	See: Cucumber mosaic virus
Sweetpotato feathery mottle virus	
Sweetpotato internal cork virus	
Sweetpotato russet crack virus	
Sweetpotato yellow dwarf virus	
Tobacco etch virus	
Tobacco mosaic virus	Tomato mosaic. Shoestring (in cool climate)
Tobacco rattle virus	Potato stem mottle
Tobacco ringspot virus	
Tomato big bud disease	(MLO)
Tomato double streak virus	Combination: Tobacco mosaic virus and Potato virus X. Double virus streak tomato/pepper
Tomato fern leaf (shoestring) virus	Commonly Cucumber mosaic virus, also Tobacco mosaic virus during cool weather
Tomato ringspot virus	
Tomato shoestring virus	See: Tobacco mosaic virus
Tomato spotted wilt virus	
Turnip mosaic virus	
Tulip breaking virus	
Watermelon mosaic virus	Strains 1 and 2
Wheat streak mosaic virus	
Wild cucumber mosaic virus	

"D"-No control or quarantine action at county level.

Camellia yellow mottle virus	Virus variegation of camellia flowers
Oat Mosaic virus	Soil-borne oat mosaic

"Q"-Rejection of infested material or the pest as such, when found in a quarantine shipment.

*Apple proliferation disease	(MLO)
*Beet yellow wilt disease	(MLO) Yellow wilt of sugarbeet
*Cherry albino disease	(MLO) Cherry albino
Citrus greening disease	(MLO)
Coconut lethal yellowing disease	(MLO)
Hibiscus yellow vein mosaic virus	
Hydrangea virescense phyllody	(MLO)
Lethal yellowing of palms	(MLO) virus-like disease
Pea seed-borne mosaic virus	Pea fizzletop
Plum pox virus	Sharka
*Rice dwarf virus	
*Rice hoja blanca virus	
Rose wilt virus	
Sunflower mosaic virus	Probably misinformation A seed-borne virus reported in Argentina in 1949. Repeated research failed to confirm.

STATE OF CALIFORNIA
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PEST RATING LIST
PLANT PATHOGENS: Virus and Virus-like Diseases

RATING	VIRUS, VIRUS-COMPLEX, DISEASE	COMMON NAME, REFERRAL REMARKS
-	Alfalfa dwarf	see: Grape Pierce's disease
C	Alfalfa mosaic virus	Calico of potato/pepper
C	Almond calico virus	Drake almond bud failure (not to be confused with genetic bud failure), a strain of Prunus ringspot virus
C	Apple chlorotic leaf spot virus	Symptomless in most commercial apples pear mosaic. Raspberry bushy dwarf
C	Apple flat limb virus	Symptomless in some varieties, damaging in "Gravenstein"
C	Apple green crinkle virus	
-	Apple mosaic virus	Strain of Prunus ringspot virus
Q	*Apple proliferation disease	(MLO)**
-	Apple star cracking virus	see: Apple green crinkle virus
C	Apple stem pitting virus	
B	Apricot ring pox virus	Cherry twisted leaf. Apricot ring pox
C	Artichoke curly dwarf virus	
C	Aster yellows disease	(MLO)
C	Barley stripe mosaic virus	Barley false stripe
C	Barley yellow dwarf virus	
C	Bean common mosaic virus	Common bean mosaic. Bean virus 1
C	Bean yellow mosaic virus	Yellow bean mosaic Bean virus 2
C	Beet curly top virus	Curly top of beet/tomato/pepper/bean green dwarf of potato
C	Beet mosaic virus	
C	Beet western yellow virus	
C	Beet yellow net virus	
C	Beet yellow stunt virus	
Q	*Beet yellow wilt disease	(MLO). Yellow wilt of sugarbeet
C	Beet yellows virus	Beet yellows
C	Blackberry dwarf virus	
C	Blackberry mosaic virus	in part: Tomato ringspot virus in art: Prunus ringspot virus

*An asterisk placed before the name denotes that the pest is on the Detection Target List (see Detection Manual DT-4:0).
**Mycoplasma-like organism.

RATING	VIRUS, VIRUS-COMPLEX, DISEASE	COMMON NAME, REFERRAL REMARKS
-	Cabbage black ringspot virus	see: Turnip mosaic virus
D	Camellia yellow mottle virus	Virus variegation of camellia flowers
C	Carnation etched ring virus	
C	Carnation necrotic fleck	
C	Carrot motley dwarf virus	Motley dwarf
C	Cattleya infectious blossom necrosis virus	Strain of Cymbidium mosaic virus
C	Cauliflower mosaic virus	
C	Celery mosaic virus	Western celery mosaic
-	Celery yellows	see: Aster yellows disease(MLO)
Q	*Cherry albino disease	(MLO). Cherry albino
-	Cherry bark blister virus	see: Cherry necrotic rusty mottle virus
-	Cherry buckskin disease	see: Peach western x-disease
B	*Cherrylittlecherrydisease	Symptomless in flowering cherry; Kootenay little cherry. K & S little cherry
B	Cherry mottle leaf virus	
B	Cherry necrotic rusty mottle virus	Cherry bark blister virus (Syn.)
B	Cherry rasp leaf virus (American)	Raspleaf of cherry/peach
C	Cherry rugose mosaic virus	Strain of Prunus virus
B	Cherry rusty mottle virus	Mild rusty mottle. Severe rusty mottle
-	Cherry sour yellows virus	see: Prune dwarf virus
C	Chrysanthemum stunt virus	
Q	Citrus greening disease	(MLO)
A	Citrus tristeza virus	Quick decline
C	Clover yellow mosaic virus	Pea Mottle
C	Clover white clover mosaic virus	
Q	Coconut lethal yellowing disease	(MLO)
B	Cotton leaf crumple virus	
-	Cowpea mosaic virus	various viruses
C	Cucumber mosaic virus	Cucumber mosaic. Beet dwarf. Canna mosaic. Daphne mosaic. Delphinium stunt. Limabean mosaic. Passion-fruit woodiness. Raspberry yellow blotch Spinach blight. Tomato shoe string (=Tomato fernleaf)

RATING	VIRUS, VIRUS-COMPLEX, DISEASE	COMMON NAME, REFERRAL, REMARKS
-	Currant mosaic virus	see: Tomato ringspot virus
C	Dasheen mosaic	
A	*Elm phloem necrosis disease	(MLO)
C	Filaree red leaf virus	
-	Grape enation virus	see: Grape fanleaf virus
B	Grape fanleaf virus	Fanleaf, Enation, veinbanding, yellow mosaic
C	Grape Pierce's disease	(bacterium-like microorganism)
-	Grape veinbanding virus	see: Grape fanleaf virus
-	Grape yellow mosaic virus	see: Grape fanleaf virus
Q	Hibiscus yellow vein mosaic virus	
C	Hippeastrum mosaic	
C	Hop mosaic virus	
Q	Hydrangea virescense phyllody	(MLO)
C	Kalanchoe mosaic virus	
C	Lettuce big vein virus	
C	Lettuce mosaic virus	
C	Lettuce speckles disease	
C	Lily necrotic fleck virus (Easter lily fleck)	Combination: Lily symptomless virus and Cucumber mosaic virus
C	Loganberry calico virus	
-	Maize dwarf mosaic	see: Sugarcane mosaic virus
C	Malva vein clearing virus	
-	Malva yellows virus	see: Beet western yellows virus
C	Muskmelon vein necrosis virus	
C	Narcissus mosaic virus	various viruses
D	Oat mosaic virus	Soil-borne oat mosaic
B	Ollalie dwarf disease	Cause unknown
B	Onion yellow dwarf virus	Yellow dwarf of onion/Allium
C	Pea enation mosaic virus	
Q	Pea seed-borne mosaic virus	Pea fizzletop

RATING	VIRUS, VIRUS COMPLEX, DISEASE	COMMON-NAME, REFERRAL REMARKS
C	Quince stunt virus complex	Probable combination: Quince sooty ringspot virus and Apple chlorotic leafspot virus
C	Radish mosaic virus	
C	Raspberry yellow mosaic virus	
C	Raspberry yellow net virus	
-	Red currant mosaic virus	see: Tomato ringspot mosaic virus
Q	*Rice dwarf virus	
Q	*Rice hoja blanca virus	
B	Rose leaf curl virus	
-	Rose mosaic	see: Prunus ringspot virus
B	Rose rosette disease	Rose witches'-broom
B	Rose spring dwarf disease	
C	Rose streak virus	
Q	Rose wilt virus	
-	Sorghum concentric ring blotch virus	see: Sugarcane mosaic virus
C	Sowthistle yellow vein virus	
-	Spinach yellow dwarf virus	
C	Squash leaf curl virus	
C	Squash mosaic virus	
C	Strawberry yellows virus	Combination: two or more viruses from two groupings, minimum of one from each group (Not to be confused with Blakemore yellows)
-	Sugarbeet curly top virus	see: Beet curly top virus
C	Sugarcane mosaic virus	Sugarcane mosaic on sugarcane
C	Sugarcane mosaic virus, Johnson grass strain	Sugarcane mosaic on corn/Johnson grass. Maize dwarf mosaic
-	Sunflower mosaic	see: Cucumber mosaic virus
Q	Sunflower mosaic virus	Probably misinformation. A seed-borne virus reported in Argentina in 1949. Repeated research failed to confirm.
C	Sweetpotato feathery mottle virus	
C	Sweetpotato internal cork virus	
C	Sweetpotato russet crack virus	
C	Sweetpotato yellow dwarf virus	
C	Tobacco etch virus	
C	Tobacco mosaic virus	Tomato mosaic. Shoestring (in cool climate)
C	Tobacco rattle virus	Potato stem mottle
C	Tobacco ringspot virus	

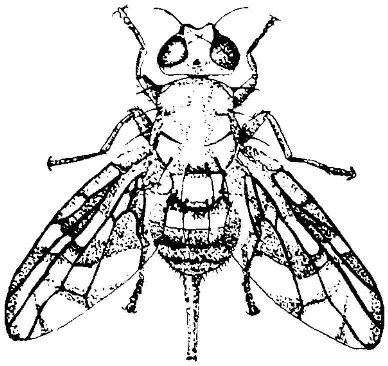
RATING	VIRUS, VIRUS-COMPLEX, DISEASE	COMMON NAME, REFERRAL, REMARKS
C	Tomato big bud disease	(MLO)
C	Tomato double virus streak	Combination: Tobacco mosaic virus and Potato virus X. Double virus streak of tomato/pepper
-	Tomato fern leaf (shoe string) virus	Commonly Cucumber mosaic virus, also Tobacco mosaic virus during cool weather
C	Tomato ringspot virus	
B	Tomato ringspot virus in peach	Peach yellow bud mosaic virus; Prunus stem pitting virus
-	Tomato shoestring virus	see: Tobacco mosaic virus
C	Tomato spotted wilt virus	
C	Turnip mosaic virus	
C	Tulip breaking virus	
A	*Walnut bunch disease	(MLO). Bunch disease; Witches' broom
C	Watermelon mosaic virus	Strains 1 and 2
C	Wheat streak mosaic virus	
C	Wild cucumber mosaic virus	

PLANT NEMATOLOGY

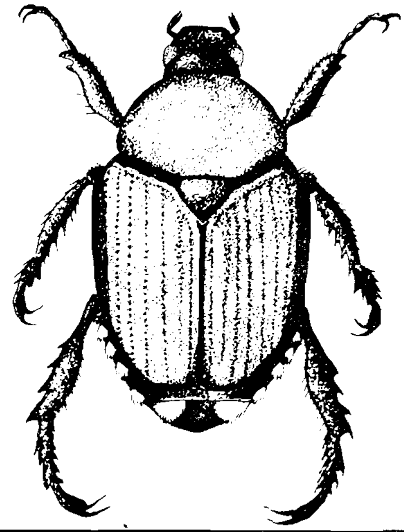
"A" and "Q" Rated Nematode Identifications of Quarantine Shipments and Border Station Interceptions in 1985

	Origin	Associated Host	Point of Interception	CDFA No.
Radopholus similis	Florida	*Paurotis*	San Diego Co.	N5803
	"	*Philodendron*	San Mateo Co.	N 762
	"	plants	Blythe Insp. Sta.	N6724
	"	plants	Blythe Insp. Sta.	N2435
	"	soil	Winterhaven Insp. Sta.	N1497
	Hawaii	*Anthurium*	Los Angeles Co.	N8126
	"	"	" " "	N8127
	"	"	" " "	N7312
	"	"	" " "	N2452
	"	"	San Diego Co.	N2014
	"	"	" " "	N7710
	"	*Chamaedorea*	Orange Co.	N4580
	"	ginger	Butte Co.	N1505
	"	Neanthebella	Los Angeles Co.	N8128
	"	"	San Diego Co.	N8352
	Illinois	*Anthurium*	San Bernardino Co.	N8129
	New York	*Anthurium*	Los Angeles Co.	N3117
	"	plants/soil	Winterhaven Insp. Sta.	N3029
	Texas	Neanthebella	San Diego Co.	N8577
	Costa Rica	*Calathea*	San Bernardino Co.	N5660
	(Unknown)	*Calathea*	San Bernardino Co.	N 750
Radopholus sp.	Illinois	*Anthurium*	San Diego Co.	N 179
Rotylenchulus reniformis	Florida	*Beaucarnea*	Los Angeles Co.	N4161
	"	*Dracaena*	Alameda Co.	N5393
	"	plants/soil	Needles Insp. Sta.	N1435
	"	"	Blythe Insp. Sta.	N 443
	"	"	" " "	N1223
	"	"	" " "	N4038
	"	"	Winterhaven Insp. Sta.	N5593
	"	*Schefflera*	Alameda Co.	N5389
	Texas	*Sansevieria*	San Diego Co.	N1637
	"	"	" " "	N2259
	"	ti plants	Needles Insp. Sta.	N1434
	Puerto Rico	*Dracaena*	Santa Barbara Co.	N 722
Rotylenchulus sp.	Florida	*Beaucarnea*	San Diego Co.	N7942
	"	*Schefflera*	Orange Co.	N7941
	Hawaii	*Dracaena*	" "	N4581

	Origin	Associated Host	Point of Interception	CDFA No.
Dolichodorus heterocephalus	Florida	*Brassaia actinophylla*	Los Angeles Co.	N2439
	"	*Chamaedorea elegans*	San Diego Co.	N1499
Xiphinema brasiliense	Florida	plants/soil	Blythe Insp. Sta.	N5384
Xiphinema sp.	Florida	Areca palm	San Francisco Co.	N2019



Entomology Highlights



NOTICE OF RATING CHANGES

The rating on three insect species has been officially changed. See the following list:

1) Pepper tree psyllid, *Calophya schini*, from Q to C

2) Tristania (Eucalyptus) psyllid, *Ctenarytania* sp., from Q to C

3) Fuchsia mite, *Aculops fuchsiae*, from B to C

Item #2 above, the tristania psyllid, is apparently restricted to the Brisbane box tree (*Tristania conferta*) and probably does not feed on eucalyptus as first reported in CPPDR, 2(4):109, 1983. The species is as yet unnamed, but Keith Taylor at the CSIRO facility is Tasmania has a descriptive paper currently in press.

SIGNIFICANT FINDS

ORIENTAL FRUIT FLY, *Dacus dorsalis* -(A)- As of November 13, 1985, a total of 116 adults of OFF have been caught or trapped this year in California. Twenty larval sites have been found, 16 in the Los Angeles area and four in Sunnyvale, Santa Clara County.

A total of 18 flies have been collected since September 13, 1985, the last recorded date in the previous copy of CPPDR. A grand total of 57 have been collected in the Los Angeles cities of Long Beach, Glendale, Lynwood, San Pedro, Palos Verdes Estates, Torrance, Los Angeles, Encino, Rosemead, Whittier and Compton. Another 21 have been collected in and around Sunnyvale, Santa Clara County. The following report by John Pozzi outlines the finds in Sunnyvale:

On October 11 and 14, 1985, 20 Oriental fruit flies (OFF) were detected in Sunnyvale, Santa Clara County and larvae were found on one property.

While servicing traps near recent OFF finds in Sunnyvale, County and State Department of Agriculture personnel found 13 OFF in Jackson/methyl eugenol traps at separate locations along Homestead Road, Quail Avenue, Ramon Drive and Sandpiper Court. The traps had been placed in orange, apricot, and lemon trees. One of the OFF caught was a female fly, while the remainder were all males.

In addition, USDA, PPQ, Officer Dan Hamon found third instar OFF larvae in apple at a Durham Court residence. While surveying the same property CDFA Area Manager John Connell and Economic Entomologist Mary Ann Nicolas captured seven OFF adults in plastic bags.

In the Los Angeles area, larvae have been found in apple, tomato, cherry tomato, bell pepper, lemon, peach, fig, nectarine and pineapple guava. Trapping for OFF continues around all of these finds, usually with a trap density of 25 Jackson/methyl eugenol and McPhail traps per square mile. The methyl-eugenol/dibrom male annihilation treatments are being used around all of the finds.

AFRICANIZED BEE, Apis mellifera scutellata -(Q)- Survey work continues in Kern County and adjacent areas. Finds of the first six colonies of Africanized bees have been covered in the last issue of CPPDR 4(4):104-107. The following reports by Len Foote outline further finds by project staff as of November 15, 1985:

The seventh find, confirmed September 27, 1985, was a feral bee colony nesting in a 6" steel pipe used to support a retaining wall at an oil processing facility in the Kern River Oil Field. The site is 5 miles north of Bakersfield and 1.4 miles north of the Kern River just east of Oildale. It is 2.2 miles southeast of the honey extracting plant associated with find number four. The oil company safety officer who reported the feral nest said the bees had occupied the pipe since February or March of this year and had shown no aggressive behaviour.

Because this feral colony showed definite signs of genetic dilution, no additional quarantine area will be established at this time. Apiaries within a two mile radius of the new find will be kept under hold order to prevent removal of any bees until these colonies can be tested for Africanization. A 40 square mile area around the discovery site will be surveyed for additional feral nests. If the survey turns up additional colonies showing Africanization without signs of genetic dilution, the need for additional quarantine area will be reevaluated.

The eighth find, confirmed October 2, 1985, was in an apiary of 147 colonies located five miles southeast of the original Lost Hills find. This hive had contained a fall divide made with a mated European queen at a location in the Buena Vista Lake Bed (33 miles southeast of Lost Hills), during 1984 cotton nectar flow. Before being moved to Lost Hills area on April 28, 1985, this apiary was on oranges near Famosa (33 miles east of Lost Hills). This colony had shown no aggression, but was found to be a poor honey producer and requeened for that reason shortly after sampling. All other colonies in the apiary tested European. No expansion of the quarantine area is required.

Three genetically diluted Africanized bee finds were confirmed on November 6, 1985. These were the last 20,552 samples tested since the project began.

The ninth find was a feral bee colony nesting 30 feet above ground on a tree limb at a residence located just south of Bakersfield College in the northern part of that city. The swarm was first observed the week before Easter. At the time of collection, September 22, 1985, the largest of three nest combs was about 18 inches long. There was nothing unusual about the size, color or disposition of the bees which were tightly clustered on combs with all stages of healthy brood, but very little honey. Thirty-two other nests of feral bees had previously tested European within a two-mile radius of this nest. A survey is being made of this area to find additional bee colonies for testing.

The tenth find was in a managed apiary of 153 colonies first sampled September 4, 1985. The apiary is located in the extended survey area just south of the southeast corner of the quarantine areas (T29 R23 S6). Nine other apiaries within a two-mile radius are being tested or retested to determine if any of the other 928 colonies in the area are Africanized.

The eleventh find was a football-size swarm without comb found clustered on a 10 inch pump discharge pipe 50 feet from a trap hive (T29 R23 S1) 5 miles east of find number ten and 1.5 miles south of the water tower from which number four was collected as a swarm. There was nothing unusual about the appearance of the queen or bees which remained calm while being scraped off the pipe into a plastic bag on September 13, 1985. A farm laborer said the bees had been there about a week.

The following information compiled by Len Foote and his staff gives further information on the history of honey bee use, the "Africanization" process and the techniques used in separation of European and Africanized strains.

USEFUL INFORMATION ABOUT AFRICANIZED BEES

Honey Bees Native To Old World

The common honey bee, *Apis mellifera* is one of four species of honey bees which evolved in the Old World. No species of *Apis* is native to the Americas. Cortez, during his 1519 invasion of the Yucatan, found large apiaries among the Mayas. Beeswax soon became next to gold and silver as a Spanish export from the New World, where it was produced by stingless honey-producing bees of the genera, *Melipona* and *Trigona*, still common and kept by the natives in tropical America.

Temperate And Tropical Races Of Apis Mellifera

The range of *Apis mellifera* extended over most of Europe and Africa, and parts of Asia. Temperate-evolved races of *A. mellifera* found protection against predators by nesting in cavities high in trees or rock cliffs. Protection against periods of dearth was achieved by storing surplus honey and pollen during periods of plenty. European honey bees cease field activities and cluster at low temperatures to conserve energy and food, forming an "organic furnace" consisting of a tight shell of insulating barely-active bees surrounding a heat producing core of active bees fueled by honey stores.

Tropic-evolved races of *A. mellifera* faced more formidable predators and became fiercely "defensive", making an all-out attack on invaders. In the tropics, prolonged periods of rain and drought cause dearth of nectar and pollen or water. The absconding impulse is highly developed in African races of *A. mellifera* which migrate over considerable distances to move from resource-poor to resource-rich areas. Tropical races of *A. mellifera* respond quickly to increased temperatures by fanning and water collection, and during short periods of cold greatly increase in-nest activities, running about on comb surfaces to keep brood warm, but do not cluster to form an "organic furnace", and may fly out of the nest and be lost when temperatures are too low for normal foraging activity.

Attempts To Europeanize African Bees

Modern beekeepers have selected and bred races of *A. mellifera* which seem best suited for their regions. European honey bees were introduced by early colonists into the Americas. These bees did well in temperate regions but were poor producers in tropical regions of South and Central America. Early colonists also introduced European honey bees into South Africa where they did not do well compared to the native race now known as *A. m. scutellata*. This native African honey bee has since been bred by South African bee breeders to achieve record honey production (257 kg/year), but the bee has retained its undesirable and apparently dominant traits of fierce defensiveness and readily absconding even when crossed with European honey bees.

African Bees Released In Brazil

In 1956, Dr. Warwick Estevan Kerr was sent from Brazil to Africa to obtain tropical honey bees of the best stocks to improve honey production in Brazil. He selected a total of 133 queens from several locations in Africa. Only 47 queens survived the shipment and introduction into Kerr's apiary in Sao Paulo, Brazil. All but one of these queens were from Pretoria, South Africa (24o 10' to 25o 45'S, 1400-2000 m. elevation). One was from Tabora, Tanzania (5o 2'S, 1188 m.).

The following year (1957) Dr. Kerr moved 35 of the colonies established with these (African queens confined by double excluders into a eucalyptus forest location for testing. A visiting beekeeper removed the excluders when he saw they were stripping pollen from the bees' legs. This went undiscovered for 10 days. Twenty-six (26) colonies had absconded with the African queens, including the Tabora queen which had been the most productive, but fierce, and from "non-absconding" stock.

Africanized Bees Displaced European Bees

Africanization of European bees in the State of Sao Paulo, Brazil was astonishingly rapid (70% in 8 years). Genetic dilution had been expected. Brazilian beekeepers accustomed to the gentle European bees were alarmed as was the public by the fierce defensive behavior of the Africanized bees. The bees soon became known as "Killer Bees" because of their attacks.

During 1962-64 Dr. Kerr distributed 200 mated Italian queen bees to Brazilian beekeepers to requeen Africanized colonies.

Beekeepers complained that honey production was lower with these than with the Africanized bees. Kerr in 1964 began distributing virgin Italian queens for beekeepers to cross with African drones. The resulting hybrids from some 23,000 Italian queens introduced during 1965-72 produced almost as well as Africanized bees but were almost as gentle as European bees, especially in Southern Brazil where most beekeepers now favor Africanized bees. Some beekeepers say that in temperate areas their Africanized bee colonies use so much honey to keep alive in winter that the advantage is lost.

Northbound Africanized Bees

African bees going northward into the Amazon region met little if any genetic dilution from European bees and retained most of the traits that ensure their survival and success in colonizing, but make them undesirable to man. Natural speed is moving Africanized bees northward at the rate of up to 300 miles per year. They are expected to reach Mexico by late 1985 and the United States by 1989. Foremost among their undesirable traits are their fierce defensiveness and excessive swarming tendencies. Their limited overwintering ability is expected to restrict their northward spread as it has in Argentina, but may cause genetic problems for US bee breeders. Mean maximum mid-winter (2 mo.) temperature of 16o C (60o F) appears to define overwintering limit of Africanized bees in Argentina.

Fierce Defensiveness

African bee colonies appear always to be alerted, ever ready to defend the nest. On occasion, the whole colony goes berserk and stings every living thing in sight. Experienced beekeepers usually can keep a colony under control with smoke while combs are manipulated, but, if someone appears near the hive within several weeks, the bees are likely to attack. Unprovoked attacks by African and Africanized swarms on persons and animals have been recorded in Africa and South America.

Africanized bee swarms and colonies at times are tractable, but unpredictable. Physical disturbance is the most common cause of stinging attacks by Africanized bees, but such attacks have also been caused by animal and chemical odors. Africanized bee colonies also stimulate one another to more readily attack and generally cannot be kept in close proximity or in large apiaries.

In a simple "defensiveness test" in which a small leather ball is jiggled in front of a hive entrance, the following comparisons were made:

OBSERVATION	EUROPEAN	HYBRID	AFRICAN
First Sting	229 sec.	89 sec.	14 sec.
Stings/60 sec.	1.4	10.5	35
Pursuit Distance	22 m (72')	39 m (128')	160 m (525')
Colony Recovery Time	3 min.	9 min.	28 min.

Defensiveness is intensified by jarring or vibrating and in above test with African colonies produced 92 stings on the leather ball within 5 seconds. Bees then pursued ball for more than 1000 meters (0.6 mile).

The amount of venom per African bee sting is less than delivered by a European bee. Based on tests with laboratory animals it would require 800+ African bee stings to kill a non-allergic person weighing 75kg (165 lbs.).

Excessive Swarming

Africanized bees produce reproductive swarms in greater numbers than European bees. When nectar and pollen are available Africanized bees may swarm every 5-7 weeks as compared to once per year for European bees in North America and 4X per year for European bees in New Guinea. The mated queen and a high percentage of young bees make up the prime swarm of Africanized bees. Young bees are critical to survival of newly colonized

Africanized swarms. Only bees less than 10 days of age will survive until first emergence of new adult bees. Eighty percent or more of the bees 3-8 days old leave the old nest to accompany swarms. Africanized bees also produce a greater number of afterswarms (smaller swarms with unmated queens) than European bees. The number of afterswarms per Africanized bee swarming episode is correlated to amount of sealed brood present when prime swarm issues. An Africanized bee colony may cast 1, 2 or 3 afterswarms if sufficient numbers of young adult bees emerge.

A colony of 30,000 Africanized bees can drop to less than 3,000 bees following a swarming episode. It will be 20 days before the new queen can mate and begin laying eggs to produce more bees. Honey production is drastically reduced by swarming.

Africanized bees also produce other types of swarms. Most distressing from a beekeeper's viewpoint is absconding. Africanized bees usually do not die in the hive for lack of food or water. Instead, they abscond and migrate until they find a suitable nest site or die. Small colonies, such as baby nuclei, often abscond when the queen makes her nuptial flight.

Large colonies with ample food, water and space are less likely to abscond, but may if nest is too large for them to regulate temperatures or protect against depredation including wax moths. Africanized bees are most likely to abscond during pollen dearth but colonies may also abscond for other reasons including disturbance of the nest site (hive) by the beekeeper or predators.

When nectar and pollen sources become scarce queen continues to lay eggs, but adult bees eat larvae, then abscond when last of sealed brood has emerged, often leaving viable eggs. Absconding swarms are more engorged and may travel greater distances than reproductive swarms before colonizing a new nest site. Migrating swarms often have multiple queens, usually mated, resulting from fusion of smaller swarms. Such absconding swarms may attack if disturbed. Migratory routes of "hunger" or "starvation" (absconding) swarms in Africa are well known and trapped by native beekeepers. Commercial beekeepers in Africa and South America have difficulty in dealing with the problems of excessive swarming of African and Africanized bees.

There are many other differences between Africanized bees and European bees. Some of the more significant are compared here.

CHARACTER	EUROPEAN	HYBRID	AFRICAN
Color	Variable	Variable	Variable
Development	10-21 days		18-20 days
Worker	25 days		25 days
Drone	15-16 days		14-15 days
Queens			

CHARACTER	EUROPEAN	HYBRID	AFRICAN
Worker Bee Engorged Weight	92 mg		61 mg
Worker Bee Tongue Length	4.15 mm	4.02 mm	3.87 mm
Worker Bee Longevity			
Active Season	42 days		24 days
Winter Confinement	135 days		90 days
Rainy Season			28.5 days
Worker Bee First Flight (age)	10-14 days		3 days
Queen Weight	208 mg		199 mg
Purity Under Open Selection	64.8%		58.5 %
Queen Mating Flight (age)	7-10 days		5-6 days
Drones/Mating	13		7.5
Sperm Cells/Drone	5.5 M	3.2 M	7.1 M
Egg Laying after Nuptial Flight	3 days		3 days
Eggs/Day (max)	2,500		4,000
Eggs/Year	58,164	55,390	104,520
Brood Nest Temperature	33-34o C		30-38o C
Minimum Forage Temperature	13-14o C		10-11o C
Nest Volume (feral)	45 litres		22 litres
Comb Area (feral)	23,400 cm2		8-11,000 cm2
Honey Storage Area (feral)	2,810 cm2		920 cm^2
Worker Cells/100 cm2	834		1,002*
Worker Cell Size	5.40 mm (Foundation)		4.37 mm (Brazil)
25 Worker Cells (feral)	13.5 cm		12.6 cm
Acceptance of EHB Foundation	Yes	Yes	No
Swarms/Colony/Year	1-4		5-10
Rate of Increase	4X (New Guinea)		16X (Fr. Guiana.
Rate of Spread (unassisted)	14 km/Year		200-500 km/Year

CHARACTER	EUROPEAN	HYBRID	AFRICAN
Maximum Distance/Swarm	5 km (New Guinea)		20 km w/o rest 75 km (So Am) 160 km (Africa)
Colony Survival (feral)	5.6 years		7 months

*1,500 more brood cells/standard comb.

APIARIES WITHIN QUARANTINE AREA

All but two of the 124 apiaries within the 462 square mile quarantine area have been tested and cleared for certification to move from the area. The remaining two apiaries are within two miles of find number ten and must be retested. If no more Africanized bees are found, the quarantine will be lifted after testing is completed.

TESTING PROCEDURE

The procedure to identify honey bees for the Africanized Bee Project is comprised of four steps. Steps One and Two are performed at the project's field lab in Bakersfield. Step Three is performed at U.C. Berkeley and/or CDFA Entomology lab at Sacramento which also performs Step Four with final determinations confirmed by the USDA/ARS Bee Breeding Lab at Baton Rouge, Louisiana.

Steps One and Two require 35mm slide projectors and 25 feet of projection space. Step Two requires a direct reading milligram scale. Steps Two, Three and Four require computers. Steps Three and Four require microprojectors and digitizing pads. All steps require dissecting microscopes and mounting materials.

In the field 50 live bees are taken from each colony or swarm to be tested for Africanization. The sample is immediately frozen with dry ice in portable coolers and transported to a freezer at the Bakersfield facility where the bees are kept frozen until ready for testing. Freezing is necessary to preserve the body weight for Step Two testing. Otherwise, samples could be collected and kept in alcohol.

Step One

The single character which most rapidly discriminates European bees is forewing length. The right forewings from 10 bees are mounted between 20mm X 40mm microscope slide cover glasses and inserted into a plastic 35mm slide projection mount. The slide projector is adjusted to accurately project a calibration scale. The image of the mounted wings is then projected and measured. An average wing length of 9.070mm or longer discriminates the sample as "European". Averages between 9.069mm and 8.946mm go to

Step Two. Averages shorter than 8.945mm go directly to Step Four. Of samples tested at Bakersfield 88% of the managed colony samples and 66% of the feral samples are discriminated as "European" at Step One which requires about 20 minutes per sample.

Step Two

The second Step is based on computer analysis of four characters: forewing length, hindwing length, hindleg femur length, and clean weight (bee after intestinal-crop contents and pollen-loads are removed by squeezing). Insect parts are mounted, projected and measured as in Step One, and the data entered into a computer program with the average clean weight of three lots of 10 squeezed bees each (30 bees total). The computer is programmed to evaluate data and read-out probability of sample being either European or Africanized. Step Two at Bakersfield discriminates an additional 9% of managed colony samples and 10% of feral samples as European so that only 3% or 4% of the samples are forwarded for Step Three or Four testing. Step Two testing requires about one hour per sample.

Step Three

Sample preparation for Step Three requires the mounting of the forewings from 10 bees on standard microscope slides. These are projected by a microprojector onto a digitizing pad capable of reporting to the computer the exact coordinates of indicated points on the pad's surface. Using the pad, 16 points on each projected wing are digitized for the computer to compare 47 lengths and angles of wing veins with a known data base to compute the probability of the sample's being European or Africanized. Probabilities are determined for individual bees as well as the composite sample. Step Three testing requires about two hours per sample to mount and digitize.

Step Four

Samples not receiving a definitive determination at Step Three are forwarded to Step Four testing. Microscope slide mounts are prepared using the left forewing, left hindwing, right hindleg and third abdominal sternite (wax mirror) from each of ten bees. The preparation of dissections for mounting on slides is time consuming and difficult, especially the wax mirror which must be cleaned and stained. After mounting, the slides are projected onto a digitizing pad and read, as in Step Three. Thirty-nine points on the wings, hind femora and basitarsi, and wax mirrors of the sternites are used in the multivariant morphometric analysis performed by the computer to determine the statistical probability of the sample's being European of Africanized. Probabilities are determined for individual bees and the composite sample as in Step Three. Step Four testing requires four hours per sample and provides the final determination for samples collected by the Africanized Bee Project.

KELSO VALLEY

Project personnel with the help of local beekeepers have located 12 feral bee colonies in Kelso Valley. Six of these were within a mile of the apiary site from which an Africanized colony may have swarmed in June. All tested Europeans as have 63 composite samples (10-15 bees each) collected from flowers and watering sites in various parts of Kelso Valley.

NEW STATE RECORDS

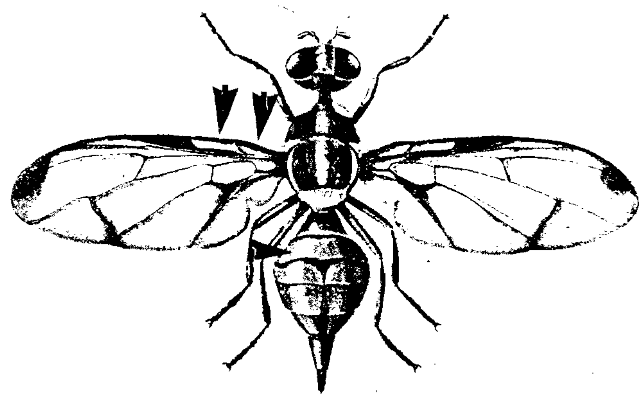
QUEENSLAND FRUIT FLY, Dacus tryoni - (A) - The find of this serious fruit pest in San Diego County constitutes a new State and North American record. The following report by John Pozzi outlines the find:

> Queensland fruit fly, Dacus tryoni, has been trapped for the first time in California. The discovery was made by San Diego County Agricultural Technician Aide, Tim Breuninger, while servicing Jackson/cue-lure traps on October 29, 1985, in La Mesa. The trap had been placed in an orange tree along Miramonte Street.
>
> CDFA Biosystematist Karen Corwin determined that the fly was a male and a fresh specimen. She also determined that it was presumably sexually mature since it responded to the cue-lure.
>
> Jackson/cue-lure trap density in the area of the find was five traps per square mile. In response to the find, the San Diego County Department of Agriculture is increasing the Jackson/cue-lure and McPhail trap densities as needed to protocol levels for new Queensland fruit fly finds.
>
> Fruit cutting in search of larvae was carried out within a quarter mile radius around the adult find, but results were negative. Trapping at protocol levels will remain in effect until March 1986.

The following economic summary about D. tryoni is taken from a pamphlet entitled "Major Fruit Flies of the World" by H.V. Weems, Entomologist for the Florida Department of Agriculture:

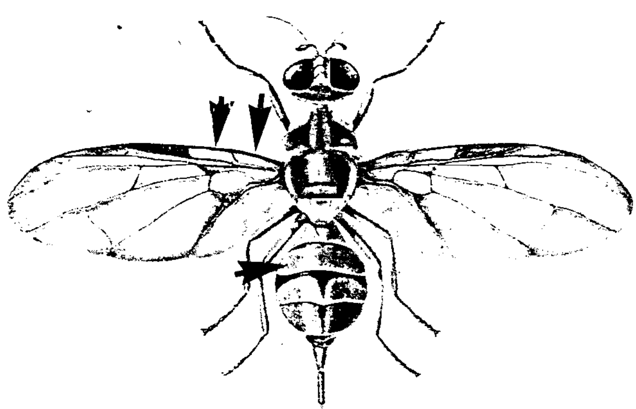
> The Queensland fruit fly occurs in climates ranging from temperate to tropical. Within its range, it is one of the most important pests with which pome and stone fruit growers have to contend, and at times it has been a very destructive pest of citrus. As many as 67 adults have been reared from one apple, and 40 larvae have been found in a single peach.
>
> Hosts: More than 100 species of fruits and vegetables, including grapefruit, sweet orange, Mandarin orange, sour orange, lemon, papaya, guava, mango, peach, mulberry, cashew, loquat, fig, plum, pear, nectarine, apricot, persimmon, apple, quince, sour cherry, tomato, cucumber, and blackberry. Bananas are said to be attacked only when overripe. Other fruits, such as grapes, are attacked only in peak years. Wild hosts include passion-flower, Passiflora spp., and the stoppers, Eugenia spp.
>
> Distribution: The Queensland fruit fly is distributed over about half of eastern Australia, including parts of Queensland, New South Wales, South Australia, and Victoria.

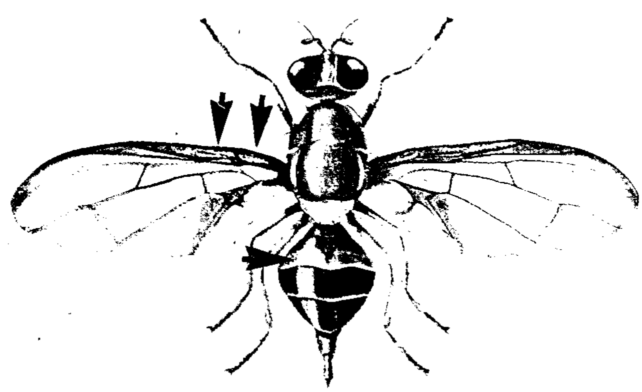
MELON FLY
Dacus cucurbitae Coquillett



ORIENTAL FRUIT FLY
Dacus dorsalis Hendel

QUEENSLAND FRUIT FLY
Dacus tryoni (Froggatt)





Illustrations of Queensland fruit fly and the two similar appearing Dacus species, oriental fruit fly and melon fly (Adapted from Weems, 1981).

Life History and Habits: Unlike several other important fruit fly pests, the Queensland fruit fly does not breed continously, but passes the winter in the adult stage. The total life cycle requires 2-3 weeks in summer and up to two months in the fall. Four or five overlapping generations may develop annually.

The Queensland fruit fly, in the genus *Dacus*, is very similar to other *Dacus* species, especially Oriental and melon flies. One noticeable difference is the light colored third abdominal segment in the Queensland fruit fly which does not occur in the other two (see single arrows). Also the basal cells in the front margin of the wings (costal cells) are darkened in the Queensland fly but clear in the other two (see double arrows).

BROAD-HEADED SHARPSHOOTER, *Oncometopia orbona* - (Q) - A specimen of this sharpshooter (Leafhopper, Cicadellidae, Subfamily Cicadellinae), was found in the leafhopper collection at the San Diego Museum of Natural History. The specimen, a male, had been collected near Lake Hodges, San Diego County on June 9, 1974. No collector was listed on the label. Although this species has been picked up on aircraft during the Japanese beetle aircraft surveys, this find is far enough removed from any airports to suggest a possibility of an infestation. It could also represent a single escape from nursery stock brought in from the southeastern United States (U.S.) that year. Since there has been 11 year lapse since the collection, the latter case would be most logical although detection personnel should be on the look out for it.

This is one of the larger U.S. leafhoppers, measuring 11 to 13mm in length. It is bigger than our largest common sharpshooter, *Homalodisca lacerta* and has a different coloration and opaque wings (largely transparent in*H. lacerta*). The complete illustration provided (Fig. 1) is of a female, which has the hardened white wax-like secretions about midway along the leading edge of each forewing. These secretions are common to several genera of proconiine sharpshooters and they occur only on the females. The coloration of *O. orbona* consists of yellow with black markings on the head, anterior prothorax and scutellum; greyish pronotum and a variable combination of red, grey and brown on the forewings.

It is apparently native to the southeastern U.S. where it occurs from Virginia southward to Florida and westward to Illinois, Missouri and Texas. It is a polyphagous feeder having been recorded from at least 47 species in 25 plant families. It is listed by Ebeling (1959) as a minor pest of citrus in Florida. It is known to be a vector of phony peach disease and Pierce's disease (Nielsen, 1968). It is known to produce 2 generations and a partial third yearly. The species may be also listed as *Oncometopia undata* in the literature.

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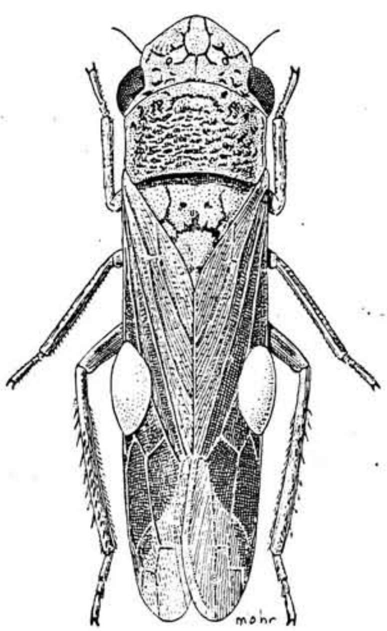


Fig. 1

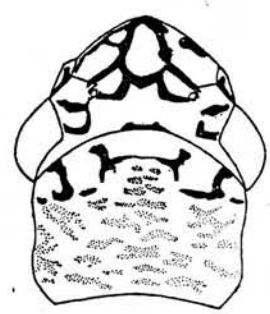


Fig. 2

Fig. 3

Fig. 1 Dorsal view of a female broad-headed sharpshooter, Oncometopia orbona. Fig. 2 Dorsal enlargement of head showing typical color pattern. Fig. 3 Lateral view of the male aedeagus. (Fig. 1 taken from DeLong, 1948; Fig. 2 and Fig. 3 taken from Young, 1968).

NEW COUNTY RECORDS

ASPARAGUS APHID, Brachycolus asparagi -(A)- This serious pest of asparagus was first found in Hemet, Riverside County in October, 1984 (See CPPDR, 3(5): 142). Later it was recorded also in Kern, Fresno, Madera and Kings counties. Since the last issue of CPPDR this pest has been collected in two more counties. On October 4, it was collected in Brawley, Imperial County by Van Maren, Natwick and Flock. Later, on October 11, it was collected in Calipatria. On October 29, it was collected for the first time in Tulare County at Richgrove by Haines and Rice.

ICE PLANT SCALE, Pulvinaria mesembryanthemi -(C)- collected for the first time from San Bernardino County along Interstate 10 at Haven on May 16, 1985. The collection was made by Lampman and Zinsmeyer.

PEPPER TREE PSYLLID, Calophya schini -(C)- Recorded by Rys and Sims from pepper tree at La Jolla, San Diego County on October 8. This is a new record for San Diego County.

OTHER FINDS OF INTEREST

CLOUDYWINGED WHITEFLY, Dialeurodes citrifolii -(A)- A heavy infestation of this whitefly was found in California in San Diego County in February, 1985. Since that time it was found also in Fullerton and Brea in Orange County. Yet another find in Orange County indicates that it is widespread there. Enns and Nisson collected it from Valencia orange at Irvine on October 24.

WHITE APPLE LEAFHOPPER -(C)- El Dorado County Farm Advisor Dick Bethel collected large numbers of this leafhopper from apples in the Camino-Apple Hill area near Placerville. This leafhopper has been rare and/or seldom collected in California so far, at least as far as CDFA records of it are concerned. Whether or not this is an unusual population upswing or whether this is an indication that the species will continue to increase and cause injury to apples in the foothill orchards is yet to be seen. However, Dick says that the hopper have been noticed in the orchard over the last several years and appears to be getting worse. Damage consists of chlorophyll removal from the leaves (hopperburn) and droppings, which make the fruit sticky and discolored. If it rains or dew develops heavily, the sticky secretions run down and accumulate around the blossom end. Since the fruit is not washed during packing, grade reducing unsightliness remains.

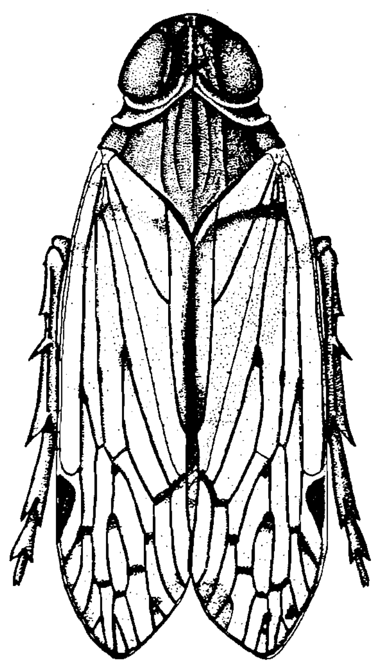
A CIXIID PLANTHOPPER, Oliarus hesperius -(C)- This planthopper caused a very uncommon and previously unknown problem in a commercial apple orchard near Brentwood, Contra Costa County during September.

The problem was honeydew and sooty mold on the leaves and fruit of a small 20 acre block of Mutsu apples. It was first brought to our attention when a local pest control advisor contacted

Brentwood Farm Advisor Liese Greensfelder. Both Greensfelder and Contra County Deputy Commissioner Ed Meyer submitted suspect insects to the lab for identification.

The culprit turned out to be Oliarus hesperius, a planthopper in the family Cixiidae. The species is native to California, and while fairly common, has never been found causing injury to commercial or dooryard plants of any kind. CDFA Homopterist Ray Gill visited the orchard to get an idea of the amount of injury, possibility of other hosts, the proximity to native vegetation and any other information which might help solve the problem. The orchard had also been visited by San Joaquin County Entomologist Kirby Brown. All who are associated with this investigation are in agreement that the planthoppers are spending at least their adult lives in the apples. It is not known at this time if the subterranean nymphs are feeding on the roots of the apple trees, on the roots of weeds growing in the centers of the rows, or on fungal mycelia in the soil.

The condition is being monitored closely. The farm advisor plans to do much needed biological studies in the orchard.



Approximate actual size of living specimens.

Adult of Oliarus hesperius, adapted from an illustration by Mead and Kramer, 1982.

QUARANTINE AND EXCLUSION

ACARINE MITE, _Acarapis woodi_ -(A)- Two specimens of bees out of one sample (3 lots totalling 1050 bees) proved to be infested with acarine mite. These mites were collected by Davis & Bingham on November 18. The mites had been transported to Modesto, Stanislaus County from near an infested area in South Dakota. On November 21, Davis, Bingham, Nicolas and Clark collected samples from another apiary location which belonged to the same owner. These also proved to be infested. For more information, see the following report by Barbara Hass:

> "A shipment of California bees which had returned to California from South Dakota has been found to be infested with acarine mite, _Acarapis woodi_. Samples submitted by Dick Davis, Stanislaus County Department of Agriculture, and Ray Bingham, CDFA, were identified as positive by Tok Kono, CDFA, on November 20, 1985. The Department will issue a news release on the infested shipment on November 21. This is to provide initial notification to all agricultural commissioners.
>
> After the shipment returned to Stanislaus County from South Dakota, it was sampled with negative results. Subsequently, information was received from South Dakota officials that the shipment was sampled before leaving and the samples were recently found to be positive by them. The shipment was intensively resampled in Stanislaus County and the mite discovered.
>
> The bees were placed under hold order during the testing period and Stanislaus County is issuing a Rejection Notice on the shipment. Disposition of the shipment, as provided in sections 6461 and 6462, Food and Agricultural Code, will be either destruction or shipment out of California (under safeguards) to an accepting state.
>
> Since these bees were in Stanislaus County for a period of time before discovery of acarine mite, we will do an intensive survey in a four square mile area around each of the two locations where the bees were set down. All apiaries within the two, four square mile areas will be placed under hold orders."

As of November 23, a total of 1,749 bee samples have been made while looking for acarine mite. That equals 92, 653 dissections. Only the above 2 apiaries have been found infested.

MELON WEEVIL, _Acythopeus curvirostris_ -(A)- A single larval specimen of _Acythopeus curvirostris_ (Boheman) (melon weevil) was intercepted by Exclusion Biologist Stephen Brown in a Galea melon from Israel. This is apparently a rarely intercepted species in the United States and is certainly an unexpected find in California, to the credit of Mr. Brown. Stephen's sharp eye, unusually good field remarks and nicely prepared larval specimen facilitated the identification process, according to Insect Biosystematist Terry Seeno.

The produce containing this pest specimen would not normally be admitted to California, as melons from Israel are permitted into the North Atlantic States only. These particular melons, however, were flown to California from New York for a trade show being held at Moscone Center in San Francisco.

Melon weevil is a pest mainly of melons (all varieties) and cucumbers. It is not known to occur in other commercially grown Cucurbitaceae. This pest is recorded from the eastern and southern Mediterranean regions, extending into northern Africa and across to India.

For more details, consult the excellent summary of the research and biology on this species (presented under a previously used name) in the following reference: Rivnay, E., 1960, The life-history of the melon weevil, Baris granulipennis (Tourn.), in Israel, Bul. Entomol. Res., 51:115-122. (Report by Terry N. Seeno).

SURINAM COCKROACH, Pycnoscelus surinamensis -(Q)- A half dozen specimens of this roach were found on September 16, 1985, in Stockton, San Joaquin County. A resident noticed it in the soil around a Dracena house plant and brought it to the San Joaquin County Agricultural Commissioner's Office. County Entomologist Kirby Brown made a tentative identification which was confirmed by CDFA Insect Biosystematist Ray Gill and Program Supervisor George Buxton.

Kirby Brown visited the site and collected a half dozen more nymphs of various sizes. The infested plant was purchased from a Stockton super market about one month ago. Unfortunately, many other Dracena plants had already been sold. According to Kirby the homeowner who found the roach reported it to the county as a result of the "Who Done It" program initiated by CDFA and the California Agricultural Commissioners.

Pycnoscelus surinamensis was the first roach reported by name from Hawaii. It has been known to feed on pineapple and rose roots and potato tubers. Surinam roach acts more like a scavenger than a regular feeder on fresh plant material, however. This species is also an intermediate host of Manson's eye worm of poultry.

This roach is one of the burrowing or digging roaches, and will burrow into soil. In this case the homeowner said that the roaches were not noticeable until the plant was watered, at which time the roaches retreat upward to the soil surface. The roach is also known to be parthenogenetic at times.

The species is common in the Hawaiian Islands and in the southeastern U.S. and many of the South Pacific Islands. It is probably Oriental in origin.

The pest rating for most exotic cockroaches had been lowered to "C" pest status. However, in 1982 it was decided that roaches in the genera Pycnoscelis and Diploptera were of economic concern to agriculture. As a result they were re-elevated to "Q" pest status. During the interim period, Surinam roach had been found in a nursery in Carpinteria, Santa Barbara County (collected by Steve Murray, October 7, 1979). No action was taken at that time because the rating was listed as "C". Subsequent survey by Santa Barbara County personnel has failed to find any continuing infestations.

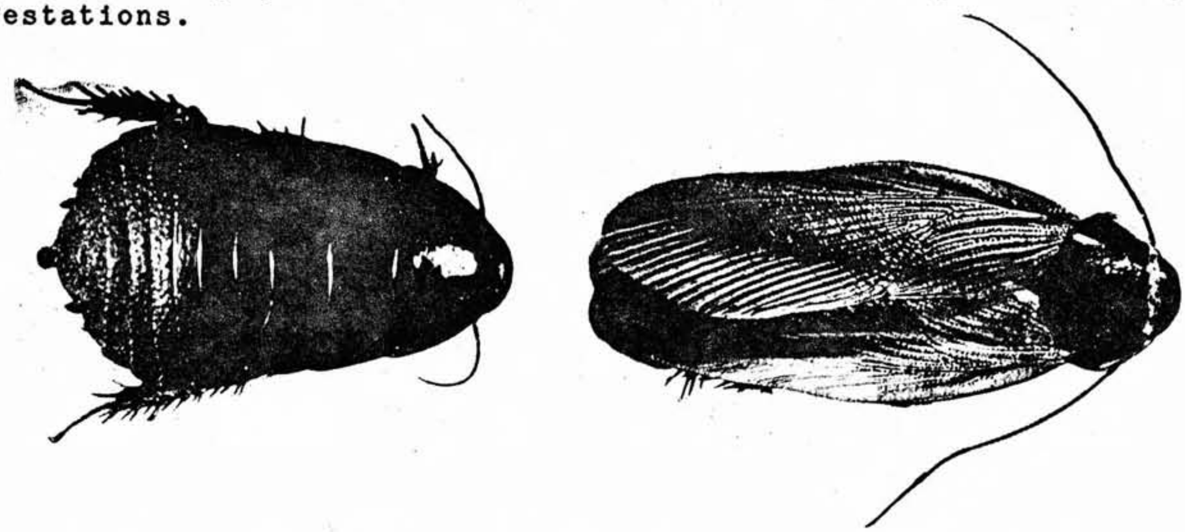


Fig. 4. Surinam roach, nymph. Fig. 5. Surinam roach, adult. Photos from Zimmerman, Insects of Hawaii.

SOUTHERN GREEN STINKBUG, Nezara viridula -(Q)- One adult of this economic pentatomid was found among some fresh greens purchased in an Asian food market in Sacramento. Khiet Le, CDFA staff librarian, made the collection on October 10, 1985. This species is a rather large pentatomid and except for some inconspicous morphological differences, looks exactly like the native California species Acrosternum hilare. Nezara can be a serious pest on many agricultural crops, particularly legumes and other vegetables.

BORDER STATIONS

It is interesting to note while reading reports of pest interceptions at California border stations that so many people actually go out of their way in an attempt to beat the system. Consider the following examples:

Apple Surprise - A Portland woman was issued a citation by Don Middleton when she left the Mt. Shasta Station after refusing to relinquish her 59 quarantined apples. Apparently, she thought the citation was "a small price to pay" to get her apples to San

Francisco. Imagine her surprise, down the road, when she saw the red light of a CHP cruiser in her rearview mirror. The arresting officer confiscated her "fugitive fruit" in addition to informing her of the citation she would be receiving in the mail. (Week of August 23).

Uncertified bee supers (210) were rejected by Matt Pastell. The truck was returned out-of-State, but observed reentering by an alternate route. San Bernardino County was notified for follow-up. (week of August 23).

Citation Issued - A load of alfalfa hay (knapweed) was rejected by Dave Bienenfeld and returned out-of-State. When the driver tried (later shift) to bring his load through, he was cited and sent back, again. Gotcha! (week of October 4).

Kudos from this issue go to Dave Gaona for that "little extra" effort. See the following report:

Chilly Ants - When a reefer of fresh chickens rolled in from Florida, Dave Gaona got that "inspector instinct" to look inside. He found frozen chickens (Zero^{o} F.), fresh chickens (packed in ice), plus very active ants (in "little parkas"). One more load of Florida ants stopped at the border. The truck was returned out-of-State. (ID pending.)

And speaking of ants.......

Arizona Follow-up - During the month of August, 1985 (Arizona Report), Arizona inspectors made 150 interceptions of red imported fire ant (*Solenopsis invicta*) at their border stations. The origins were listed as follows: Texas (86), Florida (19), Mississippi (16), Louisiana (7), South Carolina (5), Alabama (4), Georgia (4), Arkansas (2), Oklahoma (2), Tennessee (1), Illinois (1), MEXICO (1), and unknown (2).

In addition, black-headed ant (*Tapinoma melanocephalum*) was intercepted twice, from trucks (Texas, Georgia). The Florida carpenter ant (*Camponotus abdominalis floridana*) was intercepted twice (Florida) in nursery stock, and household goods. The tropical fire ant (*Solenopis geminata*) was intercepted twice (Texas) in truckloads of cat food, and paper bags.

Editorial Note - Thanks to the fine work of the Arizona Plant Quarantine Inspectors, we, in California, did not have to deal with these 156 potential infestations of ant pests last month. Thanks again. WE acknowledge and appreciate your help.

BORDER STATION INTERCEPTIONS
(Since August 1 through November 30, 1985)

			Rating
APPLE MAGGOT	*Rhagoletis pomonella*	478	A
GYPSY MOTH	*Lymantria dispar*	145	A
PECAN WEEVIL	*Curculio caryae*	51	A
HICKORY SHUCKWORM	*Cydia caryana*	50	A
WESTERN CHERRY FRUIT FLY	*Rhagoletis indifferens*	29	A
IMPORTED FIRE ANT	*Solenopsis invicta*	27	A
PINK BOLLWORM	*Pectinophora gossypiella*	25	A
JAPANESE BEETLE	*Popillia japonica*	21	A
EUROPEAN CORN BORER	*Ostrinia nubilalis*	12	A
WALNUT HUSK MAGGOT	*Rhagoletis suavis*	7	A
BOLL WEEVIL	*Anthonomus grandis*	6	A
WHITE MARKED TUSSOCK MOTH	*Orgyia leucostigma*	5	A
MAGNOLIA WHITE SCALE	*Pseudaulacaspis cockerelli*	3	A
MEXICAN FRUIT FLY	*Anastrepha ludens*	2	A
SOUTHWESTERN CORN BORER	*Diatraea grandiosella*	2	A
COLORADO POTATO BEETLE	*Leptinotarsa decemlineata*	2	A
CLOUDYWINGED WHITEFLY	*Dialeurodes citrifolii*	1	A
BLUEBERRY MAGGOT	*Rhagoletis mendax*	1	A
EASTERN TENT CATERPILLAR	*Malacosoma americanum*	25	Q
ORIENTAL SCALE	*Aonidiella orientalis*	5	Q
CARPENTER ANT	*Camponotus abdominalis*	4	Q
SPOTTED CUCUMBER BEETLE	*Diabrotica undecimpunctata howardii*	3	Q
SUNFLOWER BEETLE	*Zygogramma exclamationis*	3	Q
COMSTOCK MEALYBUG	*Pseudococcus comstocki*	2	Q
A LEAF BEETLE	*Acalymna gouldi*	2	Q
SURINAM COCKROACH	*Pynoscelus surinamensis*	2	Q
GREY SUGARCANE MEALYBUG	*Dysmicoccus boninsis*	2	Q
NORTHERN CORN ROOTWORM	*Diabrotica longicornis*	1	Q
PEPPER MAGGOT	*Zonosemata electa*	1	Q
TRILOBED SCALE	*Pseudaonidia trilobitiformis*	1	Q
CITRUS FLATID PLANTHOPPER	*Metcalfa pruinosa*	1	Q
A SLUG	*Veronicella floridana*	1	Q
ASIATIC GARDEN BEETLE	*Maladera castanea*	1	Q
MANGO FLOWER BEETLE	*Protaetia fusca*	1	Q
ARROWHEAD SCALE	*Unaspis yannonensis*	1	Q
CAMPHOR SCALE	*Pseudaonidia duplex*	1	Q
SOUTHERN GREEN STICKBUG	*Nezara viridula*	1	Q
BEAN LEAF BEETLE	*Cerotoma trifurcata*	1	Q
PUSS CATERPILLAR	*Megalopyge opercularis*	1	Q
WEEVIL	*Conotrochelus* sp.	12	A
WEEVIL	*Curculio* sp.	7	A
SHUCKWORM	*Cydia* sp.	4	A
FRUIT FLY	*Anastrepha* sp.	2	A
BAGWORM	*Thyridopteryx* sp.	1	A
WEEVIL	Curculionidae	16	A
TENT CATERPILLAR	*Malacosoma* sp.	63	Q
ANT	*Paratrechina* sp.	19	Q
SCARAB BEETLE	*Phyllophaga* sp.	7	Q
LEAF SKELETONIZER	*Bucculatrix* sp.	5	Q

BORDER STATION INTERCEPTIONS

(Since August 1 through November 30, 1985)

			Rating
CUTWORM	Euxoa sp.	4	Q
SOD WEBWORM	Crambus sp.	2	Q
TUSSOCK MOTH	Orgia sp.	2	Q
SCARAB BEETLE	Anomala sp.	2	Q
WHITE FLY	Aleurocerus sp.	1	Q
GELECHIID MOTH	Gelechia sp.	1	Q
WEEVIL	Tyloderma sp.	1	Q
MARGARODID SCALE	Icerya sp.	1	Q
ADELGID APHID	Adelges sp.	1	Q
WOOLY BEAR	Arctiidae	44	Q
TENT CATERPILLAR	Tortricidae	7	Q
GELECHIIDAE	Gelechiidae	4	Q
GRAIN MOTH	Pyralidae	3	Q
MEALYBUG	Pseudococcidae	3	Q
CUTWORM	Noctuidae	2	Q
LOOPER OR MEASURING WORM	Geometridae	2	Q
SHARPSHOOTER	Homalodisca or Paraulacizes	1	Q
SCALE	Diaspididae (cover only)	1	Q
FLY	Cecidomyiidae	1	Q
CIXIID PLANTHOPPER	Cixiidae	1	Q
MOTH (BORER)	Cossidae	1	Q
MILLIPEDES	Diplopoda (Julidae?)	1	Q
CALIFORNIA RED SCALE	Aonidiella aurantii	14	B
PURPLE SCALE	Lepidosaphes beckii	9	B
CHAFF SCALE	Parlatoria pergandii	8	B
GLOVER SCALE	Lepidosaphes gloverii	3	B
CRAZY ANT	Paratrechina longicornis	3	B
HOLLY LEAFMINER	Phytomyza ilicis	2	B
STRIPED MEALYBUG	Ferrisia virgata	2	B
SNAIL	Sybulina octona	1	B
SNAIL	Bradybaena similaris	1	B
SNAIL	Subulinidae	1	B

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